

TC

824

C2

A2

no. 136

Appx. B

Physical
Sci. Lib.

U.C.D. LIBRARY

LIBRARY

UNIVERSITY OF CALIFORNIA

DAVIS



State of California
THE RESOURCES AGENCY

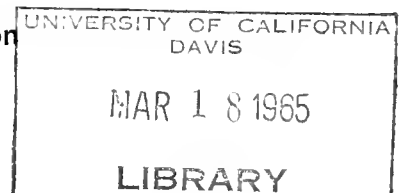
Department of Water Resources

BULLETIN No. 136

NORTH COASTAL AREA INVESTIGATION

Appendix B RECREATION

By
Department of Parks and Recreation

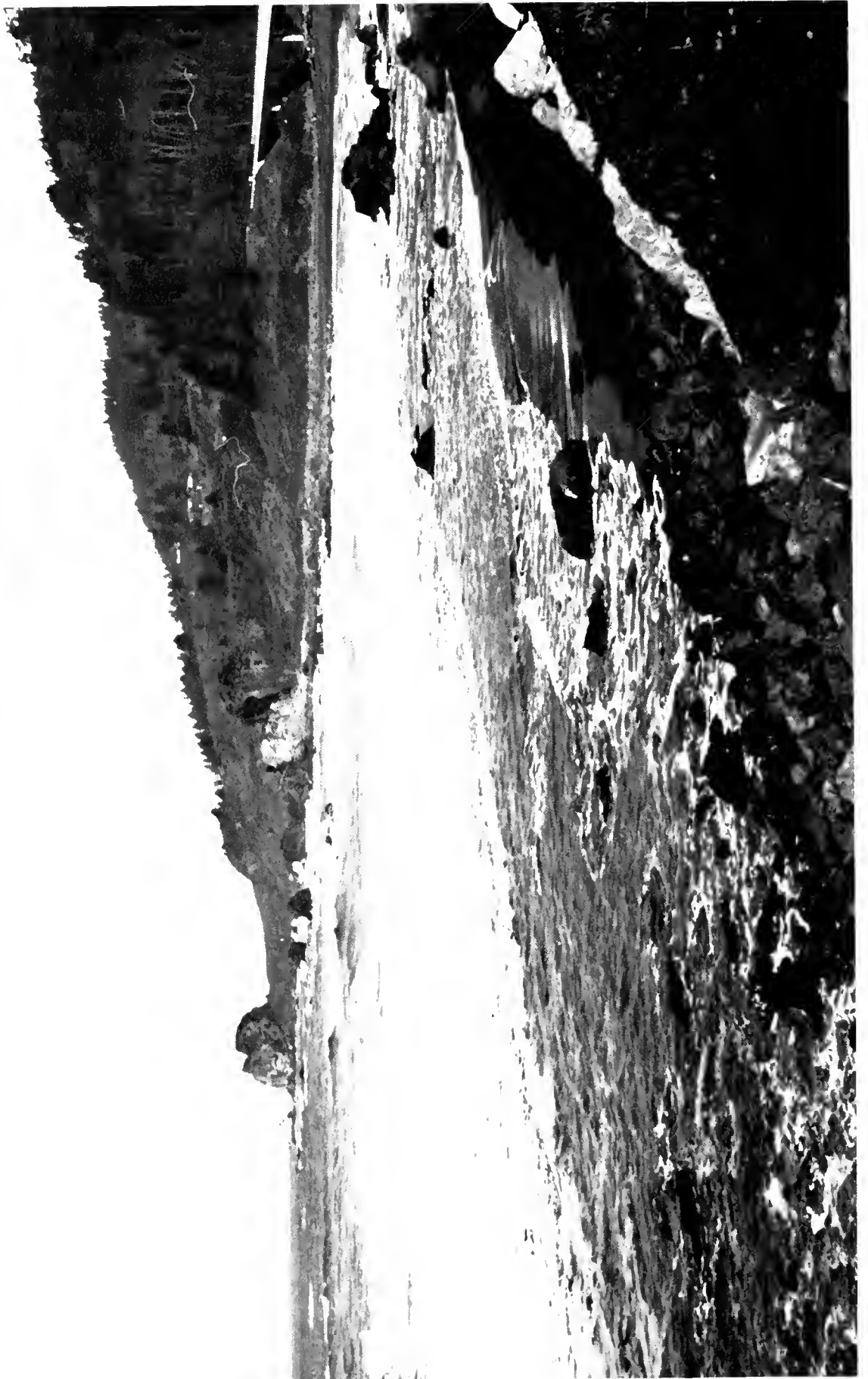


MARCH 1965

HUGO FISHER
Administrator
The Resources Agency

EDMUND G. BROWN
Governor
State of California

WILLIAM E. WARNE
Director
Department of Water Resources



State of California
THE RESOURCES AGENCY
Department of Water Resources

BULLETIN No. 136

NORTH COASTAL AREA
INVESTIGATION

Appendix B
RECREATION

By
Department of Parks and Recreation

MARCH 1965

HUGO FISHER
Administrator
The Resources Agency

EDMUND G. BROWN
Governor
State of California

WILLIAM E. WARNE
Director
Department of Water Resources

U.C.D. LIBRARY

FOREWORD

The report on the North Coastal Area Investigation consists of Bulletin No. 136, four separately bound appendixes to the bulletin, and three separately bound office reports. The appendixes cover the subjects of watershed management, recreation, fish and wildlife, and engineering geology. The office reports cover alternative plans for development, designs and cost estimates, and hydrology. The land and water use and economics data utilized in the investigation will be published in the Bulletin 94 series on land and water use in the various hydrographic units and in Bulletin No. 142-1 on water resources and future water requirements in the North Coastal Hydrographic Area.

Bulletin No. 136 provides a general description and summary of the investigation. It contains discussions of the objectives, activities, and conclusions of the investigation and a description of the plans which have been formulated. The technical record of the investigation is summarized in the appendixes and office reports. A brief discussion of the North Coastal Area Investigation is presented in Chapter I of this appendix.

The evaluation of the recreation potential of possible water developments is authorized by Section 345 of the State Water Code, which requires the consideration of water-associated recreation when evaluating potential state water projects. In 1958, the Department of Water Resources established a Recreation Unit to conduct recreation planning studies for water projects. The department maintained this staff until July 1, 1963, when recreation planning functions were transferred to the Department of Parks and Recreation, Division of Beaches and Parks. With transfer of the water project recreation planning function to the Division of Beaches and Parks, recreation study has been accomplished under an interagency agreement between the Department of Parks and Recreation and the Department of Water Resources.

This appendix was prepared by the Department of Parks and Recreation for the North Coastal Area Investigation in partial fulfillment of Interagency Agreement No. 252781. It discusses the recreational resources of the North Coastal area and the possible recreational impact of water development proposals being considered.

TABLE OF CONTENTS

	<u>Page</u>
FOREWORD	iv
LETTER OF TRANSMITTAL	xix
ORGANIZATION, DEPARTMENT OF WATER RESOURCES	xx
ORGANIZATION, CALIFORNIA WATER COMMISSION	xxi
CHAPTER I. INTRODUCTION	1
North Coastal Area Investigation	1
Need	1
Scope	2
Selected Projects	3
Future Investigations	4
Recreation Studies	4
CHAPTER II. BEGINNING OF ECONOMIC AND CULTURAL DEVELOPMENT . . .	7
Early Isolation from San Francisco Settlements	7
American Settlers Establish Transbay Commerce	8
Russian Influence	8
Beginning of Commercial Forestry	9
CHAPTER III. STATE AND FEDERAL LAND RESERVATIONS FOR RECREATION: 1850 - 1910	11
The Yosemite Grant of 1864	11
Early Attempt to Preserve Russian River Redwoods (1860's) . .	12
Federal Recommendations for a Redwood Preserve (1879)	13
Attempt to Establish a Redwood State Park on the Russian River (1880)	13
Efforts to Establish a Redwood State Park in San Mateo County (1886)	13
California Redwood Park, Santa Cruz County (1901)	14

TABLE OF CONTENTS (Cont.)

	<u>Page</u>
First National Parks in California (1890)	15
National Forest Legislation (1891)	16
Muir Woods National Monument, Marin County (1908)	16
 CHAPTER IV. EARLY RECREATION ACTIVITIES, 1850 - 1910	 19
"San Rafael Days" Inaugurates the Sunday Excursion (1860)	19
Beginning of Scheduled Steamboat and Rail Services (1860)	19
Beginning of Tourist Travel to the Geysers and the Petrified Forest	20
Weekend Excursions to Marin County and the Russian River	21
Growth of Summer Homes on the Russian River (1893)	22
Development North of the Russian River	23
The Sunday Excursion in the Eureka Area (1884)	25
Coastal Climate Promotes Recreation at Inland Locations	25
Early Recreational Use by Non-Residents	25
 CHAPTER V. MODERN TRANSPORTATION PENETRATES THE NORTH COAST	 29
Railroad Service Joins the San Francisco Bay Area with Humboldt Bay (1914)	29
The Peanut Road (1903)	30
Beginnings of the State Highway System (1909)	31
New State Highway along the South Fork of the Eel River	31
John Muir and the National Forest Commission (1896)	32
State Highway Construction Introduces Logging to the South Fork of the Eel	33
The Split Redwoods Products Market	33

TABLE OF CONTENTS (Cont.)

	<u>Page</u>
Logging Versus the Scenic Qualities of the South Fork Eel Highway	34
Prominent Citizens Visit the New Highway	35
Save-the-Redwoods League Organized	35
Successes of the Save-the-Redwoods League	37
 CHAPTER VI. THE AUTOMOBILE AND RECREATION	 41
Influence of Travel by Automobile on Camping	41
Initial Development at Humboldt Redwoods State Park	42
Need for Indoor Facilities at State Parks	43
The Automobile Brings the Recreationist to the National Forest	44
Highways and Bridges Replace the Train and Ferry	44
Freeway Development	48
Population Growth	50
Visits by Out-of-State Residents	50
 CHAPTER VII. MARIN-SONOMA HYDROGRAPHIC UNIT	 53
Pacific Coast Seashore Recreation	53
Mountain Recreation	55
San Francisco Bay Recreation	62
Lower Sonoma County	63
Proposed State Water Projects	65
 CHAPTER VIII. RUSSIAN RIVER HYDROGRAPHIC UNIT	 67
Coastal Area	67
Russian River Resort Area (Mirabel Park to Jenner)	69

TABLE OF CONTENTS (Cont.)

	<u>Page</u>
Central Sonoma County	73
The Petrified Forest	75
The Geysers	77
Asti Winery	77
Lake Mendocino	79
Lake Sonoma	81
Proposed State Water Projects	81
 CHAPTER IX. MENDOCINO COAST HYDROGRAPHIC UNIT	 83
Tourist Use	83
Coastal Recreation Developments	85
Inland Recreation Use	89
Proposed State Water Projects	91
 CHAPTER X. EEL RIVER HYDROGRAPHIC UNIT	 93
Lake Pillsbury	93
Forest Recreation	99
Upper Main Stem Eel River	100
South Fork Eel River	102
Van Duzen River	109
Mattole River	110
Coastal Eel River and Humboldt Bay	113
Proposed State Water Projects	115
 CHAPTER XI. MAD RIVER-REDWOOD CREEK HYDROGRAPHIC UNIT	 117
Forest Recreation	117

TABLE OF CONTENTS (Cont.)

	<u>Page</u>
Coastal Recreation	123
Proposed State Water Projects	126
CHAPTER XII. KLAMATH RIVER HYDROGRAPHIC UNIT	127
Lower Klamath River	129
Main Stem Klamath River and Salmon River	134
Proposed State Water Projects	138
CHAPTER XIII. TRINITY RIVER HYDROGRAPHIC UNIT	139
Wilderness Type Areas	139
Trinity Lake and Lewiston Lake	140
Non-Reservoir Oriented Forest Recreation	145
Tourist Travel	151
Proposed State Water Projects	153
CHAPTER XIV. SHASTA-SCOTT VALLEYS HYDROGRAPHIC UNIT	155
Wilderness Type Areas	155
Dwinnell Reservoir	155
Deer Hunting	156
Fishing and the Effect of Proposed State Water Projects	156
CHAPTER XV. SMITH RIVER HYDROGRAPHIC UNIT	157
General Description	157
Coastal Recreation	159
Smith River Delta	160
The Redwood Forest	161

TABLE OF CONTENTS (Cont.)

	<u>Page</u>
Inland Areas	164
Proposed State Water Projects	165
 CHAPTER XVI. TRENDS IN RECREATIONAL ACTIVITY	 167
Growth of Public Recreation Areas and Attendance	167
Out-of-State Visitors	169
Tourist Activity	173
Annual Distribution of Recreational Use	175
 CHAPTER XVII. METHOD OF ESTIMATING RESERVOIR RECREATION ATTENDANCE	 179
Reservoir Recreation Units of the State Park System	179
U. S. Army Corps of Engineers Reservoirs	179
U. S. Bureau of Reclamation Reservoirs	180
Other Reservoirs Supporting Recreational Activities	180
Reservoir Recreation Compared to Other Available Recreation	181
Attendance at Reservoirs by Out-of-State Residents	182
Population of Mileage Zones in Relation to Reservoir Recreation Attendance	184
General Curve Used to Estimate Attendance at North Coast Projects	184
Variables that Reduce Per-Capita-Use From Successive Mileage Zones	185
Application of Per-Capita-Use and Mileage Zones to North Coastal Area Reservoir Sites	187
Projection of Population-Distance Relationship	188
Applying Changes in Leisure Time, Disposable Income, and Methods of Transportation to Future Attendance Estimates	190
Limitations Imposed by Terrain	192

TABLE OF CONTENTS (Cont.)

	<u>Page</u>
CHAPTER XVIII. ESTIMATED RECREATIONAL POTENTIAL OF INDIVIDUAL RESERVOIRS	193
Upper Eel River Reservoirs	193
Spencer Reservoir	194
Dos Rios Reservoir	197
English Ridge Reservoir	199
Trinity River Development	201
Trinity Diversion Project, Helena Reservoir	202
South Fork Trinity Project and Mad and Van Duzen Project	206
Lower Eel River Project	210
Humboldt Reservoir	214
Knights Valley Reservoir	217
CHAPTER XIX. WATER TRANSFER ROUTES	221
Clear Lake-Lake Berryessa Diversion	222
Clear Lake	222
Lake Berryessa	227
Glenn Reservoir Complex	229
Clear Creek Diversion	231
West Side Conveyance System	232
CHAPTER XX. SUMMARY	237
Early Events	237
Government and Recreation	238
Problems Associated with Recreation	239

TABLE OF CONTENTS (Cont.)

	<u>Page</u>
Contributions of Proposed Reservoirs to Recreation	240
Fishing	240
Swimming	240
Boating	241
Sightseers and Tourists	241
Outstanding Recreational Opportunities	241
Summary of Attendance and Place-of-Residence	
Evaluation of Reservoir Proposals	242
BIBLIOGRAPHY	B-1

TABLES

<u>Table No.</u>	<u>Title</u>	<u>Page</u>
1	Attendance - Stinson Beach and Tomales Bay State Parks (1954-1963)	55
2	Attendance - Mt. Tamalpais State Park (1949-1963)	61
3	Attendance - Samuel P. Taylor State Park (1949-1963)	62
4	Attendance - Sonoma County Historical Monuments (1953-1963)	64
5	Origin of Boats - Doran Park (1960)	68
6	Memorial Beach, Healdsburg, California - Survey of Place of Residence of Users (Taken on June 18, July 17, and August 20, 1961)	73
7	Number of Paid Adult Admissions - Petrified Forest (1960-1962)	76
8	Summary of Register Entries - Petrified Forest (1962)	76
9	Italian Swiss Colony - Visitors at Asti Winery (1950-1962)	78
10	Place of Residence - Visitors at the Asti Winery (July 14-20, 1962)	79
11	Summary of Annual Recreation Use - Lake Mendocino (1959-1962)	80
12	Fort Ross State Historical Monument (August 1962)	85
13	Residence of Campers - Van Damme Beach State Park (1960)	86
14	Camper Days per 1,000 Population - MacKerricher Beach State Park (1958)	87
15	Lake Pillsbury, Lake County Summary of Reservoir Operation During the Recreation Season (1943-1960)	94
16	Place of Residence of Visitors - Lake Pillsbury (1961)	95
17	Travel Distance of Visitors - Lake Pillsbury (1961)	98
18	Comparison of Car Origins - One-Log-House, Asti Winery, Border Stations (1962)	103

TABLES (Cont.)

<u>Table No.</u>	<u>Title</u>	<u>Page</u>
19	Relationship Between Distance from Place of Residence and Frequency of Visits at One-Log-House (1962)	105
20	Attendance - Several Eel River Redwood Parks (1962)	107
21	Distance to Residence - Boaters at Lake Benbow (1962)	109
22	Most Frequent City of Registration - Shelter Cove (1962)	111
23	Relationship of Frequency of Registration and Travel Distance Zone Population - Shelter Cove Camp Registrations (1962)	112
24	Summary of Place-of-Residence - Visitors to Ruth Lake (Summer 1963)	121
25	Examples of Annual State Park Attendance - Mad River- Redwood Creek Hydrographic Unit (1959-1961)	124
26	Salmon and Steelhead Angling Effort - Mad River Estuary (1963)	126
27	Recreation Use of Lower Klamath River (1962)	133
28	Klamath River Estuary - Place-of-Residence of Recreation Users (1962)	134
29	Oak Bottom Camp - Ukonom Ranger District Klamath National Forest (1962-63 Registrations)	137
30	Annual Recreation Use - Trinity Lakes Ranger District (1958-1962)	142
31	Trinity Lake District Point of Origin of Recreation Users Before and After Trinity Lake (1956 and 1962)	143
32	Relationship of Place of Residence to Frequency of Visits to Trinity Lake (1962)	144
33	Summary of Annual District Recreation Reports - Shasta-Trinity National Forests (1958-1962)	146
34	Deer Hunters County of Residence - Trinity River Hydrographic Unit (1962)	148
35	Relationship of Place of Residence to Frequency of Visits to Deerlick Springs (1962)	150

TABLES (Cont.)

<u>Table No.</u>	<u>Title</u>	<u>Page</u>
36	Weaverville Joss House Historical Monument - Distance to Visitors Place of Residence (1962).	157
37	Attendance at Jedediah Smith Redwoods State Park and at California State Parks (1950-1962).	164
38	Units or Areas with Stabilized Recreation Attendance	169
39	Traffic Entering California - Redwood Highway and Smith River Stations (1958-1962)	170
40	Non-California Residents in the North Coast	171
41	Reservoir Recreation by Non-Residents of California	182
42	Points on Curve For Considering Reservoir Site and 1960 Population Distribution	185
43	North Coast Reservoir Location in Relation to 1960 Population	187
44	State Population Factors (1960-2050)	189
45	State Per Capita Use Factors (1960-2050)	190
46	Spencer Reservoir Potential Attendance (1960-2030)	196
47	Spencer Reservoir Expected Attendance (1980-2030)	196
48	Dos Rios Reservoir Expected Attendance (1980-2030)	199
49	English Ridge Reservoir Expected Attendance (1980-2030)	200
50	Summary of Net Attendance Estimates Upper Eel River Reservoirs (1980-2030)	201
51	Physical Comparison of Helena, Shasta, and Trinity Reservoirs	202
52	Place-of-Residence of Visitors - Proposed Helena; Trinity Lake District, 1956 (pre-Trinity Lake); and Tannery Gulch Campground, 1962 (on Trinity Lake)	204
53	Helena Reservoir Expected Attendance (1980-2030)	205
54	Expected Attendance for Reservoirs of South Fork Trinity Project and Mad and Van Duzen Project	206

TABLES (Cont.)

<u>Table No.</u>	<u>Title</u>	<u>Page</u>
55	Ruth Lake: Place-of-Residence of Recreation Users	209
56	Place-of-Residence of Visitors Sequoia and Bell Springs Reservoirs	211
57	Estimated Attendance Sequoia and Bell Springs Reservoirs (1990-2040)	213
58	Humboldt Reservoir Estimated Attendance (2000-2050)	215
59	Place-of-Residence of Visitors Humboldt Reservoir Area	216
60	Knights Valley Reservoir Expected Attendance (1970-2020)	219
61	Glenn Reservoir Complex Expected Attendance (1980-2030)	231
62	Westside Conveyance System Expected Attendance (1980-2030)	235
63	Westside Conveyance System, Deerlick Springs, and Shasta Lake User-Origin Comparison	236
64	Recreation Use Estimates for North Coast Reservoir Sites With and Without Water Development (1960 conditions)	243
65	Place-of-Residence of Recreation Users (by Annual Attendance) at North Coast Reservoirs (1960 conditions) . .	244
66	Place-of-Residence of Recreation Users (by percent) at North Coast Reservoirs (1960 conditions)	245

ILLUSTRATIONS

	<u>Page</u>
The North Coast in Del Norte County	Frontispiece
The Eureka	46
Sidney B. Cushing Theatre	58
Marin County Hiking Trail	60
A Russian River Swimming Beach	70
Fort Ross State Historic Park	84
Noyo Harbor	88
Lake Pillsbury	92
Famous One-Log-House	104
Visitor Information Center	106
State Park Naturalist Conducted Campfire	106
The Avenue of the Giants	108
Ruth Lake	118
Roosevelt Elk	122
Taylor Lake	128
Trinity Alps	128
Klamath River Estuary	130
Dwinnell Reservoir	154
Smith River Swimming Beach	162
Family Camping in the Redwoods	162
Iron Gate Reservoir	178

FIGURES

<u>Figure No.</u>		<u>Page</u>
1	Visitors to Muir Woods National Monument for the Years 1919 through 1962 and Population of California by Decade from 1920 to 1960	57
2	Relation Between Population of Travel Distance Zones and Recreational Use	183

PLATES

(Plates follow Page B-4)

<u>Plate No.</u>	
1	Preview of Additional Facilities to the State Water Resources Development System in the North Coastal Area and West Side Sacramento Valley
2	Location Map for the Recreation Reconnaissance in the North Coastal Area and West Side Sacramento Valley

DEPARTMENT OF WATER RESOURCES

P. O. BOX 388
SACRAMENTO

November 5, 1964

Honorable Edmund G. Brown, Governor
and Members of the Legislature
of the State of California

Gentlemen:

I am pleased to transmit herewith an appendix to Bulletin No. 136, "North Coastal Area Investigation", entitled Appendix B, "Recreation".

This appendix has been prepared by the Department of Parks and Recreation under an interagency agreement with the Department of Water Resources.

The appendix includes the history of private and governmental participation in the development of the recreational resources of the North Coastal area, a reconnaissance of the present recreational resources of the area, and an appraisal at the reconnaissance level of the recreational impact of the water development proposals considered in the North Coastal Area Investigation.

The appendix lays the foundation for further and more detailed recreation planning to be undertaken in the North Coastal area.

Sincerely yours,

A handwritten signature in cursive script, reading "William E. Warne", is written over the typed name.

Director

State of California
The Resources Agency
DEPARTMENT OF WATER RESOURCES

EDMUND G. BROWN, Governor
HUGO FISHER, Administrator, The Resources Agency
WILLIAM E. WARNE, Director, Department of Water Resources
ALFRED R. GOLZE', Chief Engineer
JOHN R. TEERINK, Assistant Chief Engineer

Bulletin No. 136 was prepared by the Northern Branch under the
direction of

John M. Haley Chief, Northern Branch
Stuart T. Pyle Chief, Planning Section, Northern Branch
Eugene F. Serr Chief, North Coastal Investigations

DEPARTMENT OF PARKS AND RECREATION

CHARLES A. DETURK, Director
EDWARD F. DOLDER, Chief, Division of Beaches and Parks
JAMES E. WARREN, Deputy Chief, Planning and Control

This appendix to Bulletin No. 136 was prepared by the
Recreation Contract Services Unit under the
direction of

William J. Haussler Supervisor
Henry A. Hjersman Assistant Supervisor
George Reiner Recreation Planner III

by

James D. McDade Recreation Planner II

CALIFORNIA WATER COMMISSION

RALPH M. BRODY, Chairman, Fresno

WILLIAM H. JENNINGS, Vice Chairman, La Mesa

JOHN W. BRYANT, Riverside

JOHN P. BUNKER, Gustine

IRA J. CHRISMAN, Visalia

JOHN J. KING, Petaluma

EDWIN KOSTER, Grass Valley

NORRIS POULSON, La Jolla

MARION R. WALKER, Ventura

-----O-----

ORVILLE L. ABBOTT
Engineer

WILLIAM M. CARAH
Executive Secretary

CHAPTER I INTRODUCTION

This chapter describes the North Coastal Area Investigation and the scope of the recreation appendix. The geographic area covered by the investigation is shown on Plate No. 1, entitled "Possible Additional Facilities to the State Water Resources Development System in the North Coastal Area and West Side Sacramento River Valley." This area embraces the principal drainage basins within the North Coastal region and related areas tributary to the potential large storage reservoirs on the west side of the Sacramento Valley. The major watersheds involved are the Klamath, Trinity, Mad, Eel, and Russian River Basins.

North Coastal Area Investigation

A primary mission of the Department of Water Resources is the implementation of the State Water Resources Development System. As defined in the California Water Resources Development Bond Act of 1959, popularly known as the Burns-Porter Act, this system includes the Central Valley Project, the State Water Facilities under construction, and the additional facilities that may be authorized by the Legislature or the Department of Water Resources to augment water supplies in the Delta and to meet local needs.

Need

In recognition of the necessity to plan for major multiple purpose projects to follow the Feather River Project (subsequently designated State Water Facilities by the Burns-Porter Act), and to establish their logical sequence of development, the department initiated the North Coastal Area Investigation in July 1958. The reconnaissance phase of the continuing

investigation was completed with the publication of **Bulletin No. 136**.

The Water Resources Development Bond Act, passed by the Legislature in 1959, and approved by the voters in 1960, provided added official recognition of the necessity to develop additional water supplies; and within certain limitations, the act provides for the financing of succeeding additions to the State Water Resources Development System.

The objective of the North Coastal Area Investigation is to formulate plans for the development of the water resources of the region, considering all potential uses, including local and export water supply needs; preservation and enhancement of fish and wildlife; development of hydroelectric power; development of water-associated recreation; and protection against floods.

Scope

The first phase of the North Coastal Area Investigation has been conducted at a reconnaissance level of intensity. The scope of the investigation is comprehensive with regard to the multiple purpose uses of the prospective export facilities. These uses include provisions for distribution of water supplies to local areas, control of floods by reservoirs, generation of hydroelectric power, fisheries preservation and enhancement, and development of recreation potential.

The program for the investigation covered all aspects of development, control, and conveyance of water. Studies ranged from cursory examination of alternatives to semi-detailed analysis of project units and features. The investigation included field work and office studies within the following categories: hydrology and meteorology, geology, surveys and topographic mapping, land and water use, water quality, economics, property appraisal, and fisheries and recreation evaluation. Operation studies to

determine conservation yield, hydroelectric power capability, and other factors for prospective multiple purpose reservoirs and export systems were conducted by both conventional and electronic machine computing methods. The intensity of design studies and cost estimates ranged from reconnaissance to reasonably detailed analysis. Based on these studies, the more favorable major projects have been selected for more intensive studies.

Selected Projects

The long-range development plans within the North Coastal and West Side Sacramento Valley areas which are recommended in Bulletin No. 136 for more intensive studies are shown on Plate No. 1. These plans are listed below in the order of development recommended at this time.

1. Paskenta-Newville Project
2. Upper Fel River Development
3. Trinity River Development
 - a. Trinity Diversion Project
 - b. South Fork Trinity Project
 - c. Mad-Van Duzen Project
4. Greater Berryessa Project
5. Lower Fel River Development
6. Klamath River Development

It will be noted on Plate No. 1 that two alternative diversion routes are shown for both the Upper Fel River and Trinity River Developments. These are the Glenn Reservoir and Clear Lake diversion routes for the Upper Fel River Development, and the Clear Creek and West Side Conveyance System routes for the Trinity River Development. Final route selection will be made in the course of future studies.

Future Investigation

With the publication of Bulletin No. 136, the reconnaissance investigation in the North Coastal area is completed. Departmental planning for major projects in the North Coastal area is being carried forward in two interrelated planning programs. These programs are:

1. A feasibility-level investigation of the Upper Eel River Development. The objective of this investigation is the final formulation of a project which will meet the requirements for additional facilities of the State Water Resources Development System. This investigation will terminate in 1968 with a report on specific features of the initial project.

2. The second program is a continuation of the area-wide investigation of the remainder of the North Coastal area. This investigation would be of an intermediate level of intensity directed toward the more detailed identification of future projects within the Trinity, Mad, Van Duzen, Lower Eel, and possibly the Klamath River Basins. The objective of this study will be to further define the specific features of the second and later-staged developments recommended in Bulletin No. 136.

Recreation Studies

This recreation reconnaissance report is concerned with outdoor recreation in the North Coastal area. The Marin-Sonoma Hydrographic Unit is also covered because of its importance in recreation considerations. The features discussed herein are delineated on Plates No. 1 and 2. The report includes the following items:

1. The historical background leading up to the settlement of the area and the development of its recreational resources.

2. The history of private and governmental participation in the development of the recreational resources of the area.

3. A reconnaissance of the present recreational resources of the area and the utilization of these resources.

4. An appraisal at the reconnaissance level of the impact of the water development proposals being considered in the North Coastal area by the Department of Water Resources.

CHAPTER II. BEGINNING OF ECONOMIC AND CULTURAL DEVELOPMENT

Recreational activities through the years have paralleled the settlement and cultural development of the area. Problems of access have resulted in two identifiable patterns of settlement and cultural advance. In the more northerly coastal area the pioneers depended on oceanic shipping to maintain their contacts with the outside world, while in the south, growth and development came as a part of the over-all evolution of the more extensive San Francisco Bay area.

Early Isolation from San Francisco Settlements

The settlement of the San Francisco Bay area dates back to the arrival of the first Spanish settlers in 1776. In the early years their activities were confined primarily to the peninsula and south bay. The necessity of traveling on San Francisco Bay was an obstacle of sufficient magnitude -- to the Spanish -- to discourage travel to and settlement of the north bay. Their ineptitude in the development of cross-bay commerce is illustrated by an event that took place in 1816. The Spanish were in need of some redwood logs to effect repairs to the Presidio, and from their knowledge of the bay area, it was decided that the best source of the logs was near present-day San Rafael. It was decided to have workers travel around the perimeter of San Francisco Bay to Carquinez Strait where they could cross over to the north bay on Indian tule rafts. After crossing to the north shore, the workers proceeded to the forests and prepared the timber for transportation to San Francisco. While these events were being carried out, a launch was being constructed to be sailed at the

proper time to the landing on the north shore. This eventually took place and two rafts of redwood logs were brought to San Francisco. The first raft, piloted by a prominent Indian named Marin, arrived at the Presidio as planned; however, when the Spanish accepted the responsibility for the second trip they inadvertently included a side trip through the Golden Gate before arriving at the Presidio.^{1/}

American Settlers Establish Transbay Commerce

During the following decade, two Americans, Mr. William R. Richardson and Mr. John Read, settled in Marin County.^{2/} Both of these men have been credited with conducting tidal commerce. In the 1830's, it was possible to travel from any landing on the bay to any other landing or to have merchandise transported to ships anchored in deep water.

Russian Influence

The arrival of the Russians at Bodega Bay and Fort Ross after the turn of the nineteenth century stimulated Spanish interest in occupying the north bay lands. A second incentive resulted from smallpox and other European diseases that had decimated the Indians at the established missions and created a labor shortage seriously hampering the efforts of the missionaries to continue their work. As a result the mission system was extended into the north bay by the establishment of Mission San Rafael Archangel in 1817 and Mission San Francisco Solano in 1823.

To Don Mariano Guadalupe Vallejo should be extended a major share of the credit for checking the progress of the Russian settlement at Fort Ross. In 1832, at the age of 24, he became commandante at

San Francisco, a post that carried the responsibility for the protection of the Northern California settlements and thwarting of the Russian encroachment. Vallejo suggested to Governor Figueroa that the best way of watching the Russians would be to establish settlements in the country north of San Francisco.^{3/}

Vallejo subsequently obtained a land grant near Petaluma and gathered together 50 prospective settlers. From his later establishments at Sonoma and Petaluma he directed and encouraged the occupation and development of nearby land, thus eliminating the prospect of Russian expansion. Vallejo's efforts were so successful that in 1841 the Russians offered to sell him their holdings. However, he did not consider their claim to the land to be valid and would not extend recognition to their claims by paying for the land. In his opinion, the other items such as livestock and hardware were not worth the price the Russians were asking. Subsequently, the Russians sold their holdings to John Sutter and abandoned all plans for occupying California.

Beginning of Commercial Forestry

Noteworthy among the early settlers whose activities were influenced by the recognized need to thwart Russian expansion was a former American, Captain John R. Cooper whose wife, Encarnacion, was a favorite sister of Vallejo's. About 1833, Cooper obtained the land grant for El Molino Rancho in Sonoma County. An account of the beginnings of the commercial sawmill industry at El Molino is given by Mr. C. Raymond Clar in California Government and Forestry, Sacramento, 1959.

"John B. R. Cooper, half-brother of Thomas Larkin, was also a trader in California as well as a ship captain. In 1833 Cooper obtained Rio Ojotska Grant on the American River. This land he soon exchanged for El Molino (the mill) Rancho in Sonoma County. It was at Molino that Cooper constructed in 1834 what appears to have been the first commercial sawmill built in California. This water-power grist and sawmill cost \$10,000 to construct, a considerable sum at that time. The structure was washed away in the very wet winter of 1840-41. It was built on the south bank of the present Mark West Creek (once called Mill Creek) about 1,000 feet from its junction with the Russian River, precisely at the east edge of the present Mirabel Park, a commercial campground."

Commercial forestry was thus launched on its career in the North Coast. Subsequent recreational development has closely followed the paths of economic development and settlement opened by the forest industry.

Although settlers continued to arrive in Northern California in increasing numbers in the 1840's, it was not until the annexation of California by the United States and the discovery of gold at Coloma that any sizable population developed on the North Coast.

NOTES: CHAPTER II

1. C. Raymond Clar, "American Government and Forestry" (Sacramento, 1959)
2. Alley, Bowen & Company, "History of Marin County" (San Francisco, 1880)
3. Edna Due Pree, "The California Dons" (New York, 1962), p. 246

CHAPTER III. STATE AND FEDERAL LAND RESERVATIONS FOR RECREATION: 1850-1910

When California became a State, only limited information was available concerning its resources. Particularly lacking was information concerning the extent of the forested lands. The early agricultural settlements were located principally outside the forested areas along the coast, at low elevations in the interior valleys and Southern California. When the early settlers traveled the routes of the El Camino Real, or from Monterey or San Francisco to Sacramento, they encountered few forested areas. Consequently, there was a widespread belief that the forest resources of the State were less extensive than actually was the case. Apparently because of this belief, Mr. Henry A. Crabb of San Joaquin County introduced a resolution into the State Assembly in 1852 which would have recommended that Congress prohibit the settlement and occupation of all public lands upon which redwood was growing. No action resulted from the introduction of this resolution. ^{1/}

The Yosemite Grant of 1864

A notable change in governmental policy took place in 1864 when California was awarded the Yosemite Grant. The significance of this action has been highlighted by Huth as follows:

"In 1864 some California gentlemen 'of fortune, of taste and of refinement' asked Senator John Conness to introduce a bill to Congress granting to the State of California the tract of land including Yosemite Valley and the Mariposa Grove Big Trees. This bill was subsequently passed and was signed by President Lincoln on June 25, 1864.

"A grant of this kind was nothing extraordinary, since the federal government often made grants to states, and undoubtedly the public paid little attention to such an action. There was, however, something out of the ordinary about this bill, and its passage set an important precedent. The gentlemen from California had

requested the insertion of a clause stating that the grant was given 'upon the express conditions that the premises shall be held for public use, resort and recreation and shall be held inalienable for all times.' These terms implied that no direct economic profit was expected from the new arrangement, though probably it was assumed that costs of upkeep would be offset by revenues from leases or privileges. This was indeed an innovation in legislation and spelled the end of an epoch. To protect an area and conserve it for recreational enjoyment was a policy that had never before been adopted for the management of the public domain." 2/

Early Attempt to Preserve Russian River Redwoods (1860's)

The next attempt to preserve a segment of California's grandeur took place in the North Coast. Clar has related the story of the Armstrong Redwoods.

"The Armstrong story actually started in the late 1860's when Colonel James B. Armstrong acquired 640 acres of the public domain at the north end of the famous Big Bottom on the Russian River where the little lumber town was named Guerneville at about this time. Armstrong was a Civil War veteran, a civil engineer, and later a newspaper publisher. He is of interest in this story because his sole interest seems to have been to turn this land with its virgin redwoods into a public park in perpetuity. It is doubtful if any similar instance exists in California history. But there was no agency of government which could or would accept the site." 3/

About this same time, Joseph Welch was resisting the efforts of loggers to enter the area later known as Santa Cruz County Big Trees and Henry Cowell Redwoods State Park. When he opened Welch's Big Trees Grove Resort to the public in 1868, it became the first coast redwood grove in the State to be preserved for the enjoyment of the people. 4/

Although Welch's Big Trees were not located in the North Coastal area, their story, coupled with the Armstrong story, points out the growing awareness that redwood groves were not inexhaustible and represented values other than those measured in board feet.

Federal Recommendation for a Redwood Preserve (1879)

A decade later the United States Secretary of the Interior Carl Schurz considered the possible fate of both species of redwoods in his official report to Congress in 1879.

"These species of trees, the noblest and oldest in the world, will entirely disappear unless some measure be taken to preserve at least a portion of them I would therefore recommend that the President be authorized to withdraw from sale or other disposition an area at least equal to two townships in the coast range in the northern, and an equal area in the southern portion of the state"

There was no response to this plea of the Secretary. 5/

Attempt to Establish a Redwood State Park on the Russian River (1880)

The facts concerning another attempt to establish a state park on the Russian River have been related by Clar.

"... about 1880 he (George E. Guerne) made a serious effort to develop state interest in purchasing Guernewood Park Resort as a state park for \$12,000. Failing in this, Guerne and Murphy logged this area about 1883." 6/

Efforts to Establish a Redwood State Park in San Mateo County (1886)

A few years later a sequence of events that ~~was~~ destined to lead to the establishment of Big Basin Redwoods State Park ~~was~~ beginning to take place. In 1886, Ralph S. Smith, editorially presenting his views in the Redwood City Times Gazette, urged that a redwood preserve be established in southern San Mateo County. In a newspaper article supporting this suggestion, the San Francisco Chronicle advanced an idea that later was utilized by the Save-the-Redwoods League in attempts to preserve the groves of the North Coast.

"It is believed that if the State of California would appropriate a portion of the purchase money, the rest could be raised by subscription from public-spirited men who know and appreciate the value of such a preserve to the State." 7/

The slogan "Save-the-Redwoods" became an integral part of the campaign that eventually resulted in the purchase of Big Basin Redwoods State Park; however, the organization responsible for this success was known as the Sempervirens Club. The objectives of the club and the the men and women behind the club were threefold:

- "1. To save the trees for posterity.
2. To save the trees for scientific study and also the many species of fauna in the basin.
3. Last and by no means the least important was to save the basin and its trees to form a great park for the people for holiday outings; to prepare a place whether our children and workmen, factory girls and others breathing all the week impure air, might, amidst the great trees and along rippling brooks, breathe pure air and rest amidst those great forests, where their minds and hearts are lifted to higher, purer, nobler things." 8/

Another contemporary writer, Edwin S. Williams, in describing the virtues of the proposed park considered its beneficial effect on the people of the State, particularly the working people of the bay cities. He also presented the viewpoint that "... even a wild boy from San Francisco's Barbary Coast may come down afoot with his blankets on his back ... and find abundant room. 'Campers keep out' may greet him on the road, but when the warden takes him in, the czar of all the Russias cannot put him and his squad out so long as they obey rules." 9/ As early as the turn of the century, residents of the San Francisco Bay area were faced with the problem of a shortage of conveniently located campsites.

California Redwood Park, Santa Cruz County (1901)

The ideas advanced in 1886 eventually led to the State Legislature's Act of March 16, 1901, creating the California State Redwood Park Commission for the purpose of purchasing and managing redwood lands at Big Basin, Santa Cruz County, as a state park. The act also appropriated \$250,000 for land purchase. 10/

The four commissioners appointed by the Governor were William H. Mills, land agent of the Southern Pacific Railroad; Father Robert E. Kenna, President of Santa Clara College; Dr. William R. Dudley, head of the Department of Botany at Stanford University; and A. W. Foster, President of the Northwestern Pacific Railroad. ^{11/} Mr. A. W. Foster, as will be shown in a later chapter, played a key role in the development of the Russian River area as a vacation land for bay area residents.

California Redwood Park at Big Basin was the first unit of what presently constitutes the State Park System. The formation of the park is of significance to the North Coast because it marks the first successful attempt to guarantee through public ownership that a particular coast redwood stand will be reserved for future public enjoyment. Additional stands were later set aside and made accessible to the public in the North Coast resulting in the preservation of an asset that has brought the area national and world wide acclaim.

First National Parks in California (1890)

A decade earlier, the federal government had initiated the first of the congressional acts that led to the formation of our present system of national parks, monuments, and forests. Three acts of the 26th Congress contained provisions that had a significant influence on future events in the North Coast.

The act of September 25, 1890, set apart the Sequoia National Park as a public park, or pleasure ground.

The act of October 1, 1890, set apart the Yosemite National Park and the General Grant National Park as forest reservations. ^{12/}

The third noteworthy piece of legislation (26 Stat. 1095) was enacted on March 3, 1891, and is discussed in the following section.

National Forest Legislation (1891)

The Secretary of the Interior, John W. Noble, recommended in his Report to Congress in 1891 that the boundary of Sequoia National Park be extended northward to include the Kings Canyon area and its tributaries. Anticipating that this recommendation might meet congressional opposition, a clause was attached to "A Bill to Repeal the Timber-Culture Laws" whereby the President could by proclamation "... set apart... in any State or Territory ... any part of public lands wholly or in part covered with timber ... as public reservations." This bill passed Congress on March 3, 1891, and became known as "The Enabling Act of 1891." ^{13/}

The above bill served as the authority under which Presidents Harrison, Cleveland, McKinley, and Theodore Roosevelt set aside some 150 million acres of forest lands. These lands include the majority of the 180 million acres now designated as National Forests, including those in the North Coast area: the Mendocino, Six Rivers, Klamath, and Shasta-Trinity National Forests.

Muir Woods National Monument, Marin County (1908)

Mr. Clar's book, entitled "California Government and Forestry", contains another reference to a state agency having suggested the reservation for park use of coast redwood lands. This suggestion was included in the Annual Report of the State Board of Horticulture for 1891, as follows:

"Mr. John H. Fowler of Santa Rosa sounded the call for some millionaire who wished to 'live in grateful remembrance in the hearts of the people' by purchasing and preserving a thousand acres of redwood forest as a park. He asked, 'Shall the glory of the redwood pass away in the nineteenth century?' " ^{14/}

This call was eventually answered in 1908 by Mr. William Kent, as follows:

"Hon. James R. Garfield, Secretary Interior, U.S.

Dear Sir: I herewith enclose a deed of gift to a tract of land in Marin County, California, more fully described by accompanying documents, and request that you accept it as provided for by the Act of June 8, 1906

In tendering it I request that it be known as Muir Woods, in honor of John Muir

Yours respectfully,

/s/ William Kent

WILLIAM KENT" 15/

The Act of June 8, 1906, is also known as the American Antiquities Act. The provisions included authorization for the President to establish by proclamation national monuments for the preservation of features of historic, prehistoric, and scientific interest. 16/

Muir Woods National Monument preserves a virgin stand of redwoods just north of San Francisco. A popular outdoor recreation area prior to 1908, its establishment as a national monument permitted it to continue to serve residents and visitors to the San Francisco Bay Area as an outdoor museum featuring the coast redwood.

NOTES: CHAPTER III

1. C. Raymond Clar, "California Government and Forestry" (Sacramento, 1959), p. 68
2. Hans Huth, "Nature and the American" (Berkeley and Los Angeles, University of California Press, 1957), p. 148-149
3. Clar, op. cit., p. 285
4. Leonard R. Fisher, unpublished manuscript on the Henry Cowell Redwoods State Park, 1957
5. Clar, op. cit., p. 69

6. Ibid., p. 285
7. "California Redwood Park" (Sacramento, California, State Printing, 1912), p. 10
8. Ibid., p. 36-37
9. Ibid., p. 30-31
10. Samuel Trask Dana and Myron Krueger, "California Lands" (Washington D. C., The American Forestry Association, 1958), p. 263
11. Don Meadows, "A Manual of the History and Biology of the Big Basin Redwoods State Park, California" (mimeographed manuscript, 1950), p. 13
12. Dana and Krueger, op. cit., p. 246
13. Linnie Marsh Wolfe, "Son of the Wilderness" (New York, Alfred A. Knopf, Inc., 1945), p. 252
14. Clar, op. cit., p. 120
15. E. T. Parsons, "William Kent's Gift", in Sierra Club Bulletin, Vol. VI, No. 5, (June 1908)
16. Dana and Krueger, op. cit., p. 248

CHAPTER IV. EARLY RECREATION ACTIVITIES, 1850-1910

Although the discovery of gold resulted in a population stamped into Central California, the North Coastal area remained relatively isolated and sparsely settled. The town of Sonoma had grown from five or six houses to more than sixty; however, the initial influx had been followed by a general decline.^{1/} The customs of the early settlers were not too severely modified by the newcomers, and many of the early traditions were continued. The bull and bear fights passed from the scene after the 1854 State Legislature prohibited their conduct on the Sabbath.^{2/} Other activities including town celebrations continued to be popular affairs.

"San Rafael Days" Inaugurates the Sunday Excursion (1860)

In 1860 Marin County was a quiet, rural settlement with a population of about 3,000.^{3/} In that year, when "San Rafael Days" were held, its citizens were treated to a preview of things to come. A special excursion boat came across the bay to Point San Quentin with an unexpectedly large number of prospective celebrators. The resulting brawl nearly brought about the cancellation of future festivities before the excursionists eventually made their way back across the bay.

Beginning of Scheduled Steamboat and Rail Service (1860)

The excursion and tourist business spread from the San Francisco Bay area into the North Coast as fast as transportation facilities were developed to accommodate its patrons. Scheduled steamboat service started serving Petaluma in 1860. The first railway, the "Petaluma and Haystack Railroad," started operations over a 3-mile route in August, 1864.

Commuter ferries to San Francisco started running out of Sausalito and Point San Quentin (serving San Rafael) by the end of the decade. Regular commuter service followed on the San Rafael and San Quentin Railroad on March 21, 1870, and shortly thereafter a few flat cars were added to the rolling stock to accommodate the Sunday picnickers.

In 1872 rail service was extended to Cloverdale, and a toll road was opened to "The Geysers." The years 1875 and 1876 saw the extension of a narrow gauge railroad from Sausalito to Tomales Bay and the Russian River. ^{4/}

The rail extensions serviced existing agricultural, lumbering, and recreational developments; however, the arrival of the railroads brought about an accelerated expansion of these activities. Tourist travel by railroad originated as a luxury item available to the very rich. This changed rapidly until by the end of the 19th Century the railroads were justly referred to as the "Great Equalizer and Civilizer," a maxim especially applicable to their effect on tourist and recreation travel.

Beginning of Tourist Travel to the Geysers and the Petrified Forest

It has been claimed that in the ten years following the Civil War, probably more tourists visited "The Geysers" than the Yosemite Valley and nearby Sierra Big Tree groves. ^{5/} The opening of Yellowstone National Park with "Old Faithful" and similar wonders depreciated the unique and spectacular nature of "The Geysers," Nevertheless, at the turn of the century the area was still one of the most popular recreation destinations in the Bay Area. After the discovery of "The Petrified Forest," 5 miles west of Calistoga, the two spectacles were often included in a single trip. A \$2.65-excursion ticket could be purchased prior to World War I permitting the purchaser to ride the ferry from San Francisco to Vallejo, ride the electric railway through

the Napa Valley to Calistoga, and then take a 5-mile stage ride to the Petrified Forest and return. Admission to the privately owned and operated Petrified Forest involved an additional fifty-cent charge. 6/

Weekend Excursions to Marin County and the Russian River

Another popular excursion in the early 1900's was known as the "Triangle Trip." Described as a full day's trip into the Russian River country, the Northwestern Pacific brought the passengers past San Rafael and Petaluma to the Russian River. While traveling down the Russian River, they transferred to the narrow guage branch and turned down the coast to Tomales Bay. Their route then crossed Marin County, along the south slope of Mt. Tamalpais, to Sausalito, the starting angle.

The weekend and vacation migration generally radiated northward from Sausalito although ferry service also operated out of Tiburon, Point San Quentin (San Rafael), and Vallejo. The prominence of Sausalito resulted from its development as the focal point for week-day commuters traveling between Marin County's growing suburbs and San Francisco. The major growth of ferry-boat traffic came after 1877 when the Sausalito and San Rafael, each capable of carrying 3,000 passengers per trip, were placed in service.

The most typical trip was probably a one-day outing into the Mt. Tamalpais country or to Muir Woods. Hiking became one of the more popular activities, and a fine system of trails developed in the country between Mill Valley and the ocean. Several inns and "tenting places" were located along the trails for the benefit of those interested in overnight trips. In the late 1890's, service started over a narrow guage sightseeing line to Mt. Tamalpais.

The coming of the railroads to the Russian River country resulted in an accelerated development of its recreational potential. In addition to the weekend excursions, the area gained fame through its resort hotels and camping opportunities. These facilities were used by visitors who wished to linger longer than the sightseeing excursion could permit. The quick one-day trip hardly permitted sampling the salmon or steelhead fishery of the Russian River, participating in river recreation, exploring the remaining redwood groves, or relaxing long enough to absorb the feeling of the country.

Growth of Summer Homes on the Russian River (1893)

The real blooming of the Russian River country as a vacation land for Bay Area residents came in the years following 1893. In that year, A. W. Foster of the Northwestern Pacific sought to increase the ~~traffic~~ on his lines opening a recreational subdivision on the Russian River. He purchased some second-growth redwood land and opened Mirabel Park. The success of this project resulted in its being followed by other similar undertakings--Camp Vacation, Montesano, Russian River Heights, Rio Nido, and Summer Home Park.

The expansion of summer recreation residences rounded out the vacation land development of the Russian River area. Towns, such as Guerneville, had originally grown in response to the needs of the logging industry. This changed as the annual summer population influx became the dominant factor in determining the nature of the growth pattern of many Russian River communities

Most of the influx of picnickers, hikers, campers, fishermen, summer home users, excursion sightseers, etc. to Marin County and the Russian River country were residents of San Francisco or the counties of Alameda, Contra Costa, and San Mateo. The populations of these counties totaled 503,000 in 1900 and increased to 721,000 in 1910.^{8/} During this time Sunday crowds of up to 100,000 visitors were passing through the ferry boat terminals at Sausalito.

The mass retreat from crowded metropolitan areas to crowded rural areas considered to be the out-of-doors is hardly a present day phenomenon. This type of activity undoubtedly will continue in future years to be a characteristic of the California way-of-life.

Development North of the Russian River

The early developments of outdoor recreation to the north of the Russian River were much less spectacular than the Marin County and Russian River activities. This was largely the result of the relative isolation and poor transportation system of the northern areas.

The Humboldt Bay settlements followed the discovery of gold on the Trinity River. Towns, started as supply centers for Trinity miners, became the commercial centers of the area as the timber industry displaced mining as the principal economic endeavor in the 1850's. Agriculture, principally dairying, gained a foothold as more lands were cleared. Although overland transportation was established at an early date between Humboldt Bay and the Clear Lake-Upper Russian River area, ocean-going ships provided the principal means of communication with the outside world. The overland route to Clear Lake traversed the ridge between the South Fork of the Eel River and the main stem of that river. The ridge contained large open grassy hillsides suitable for grazing where it was easy to locate and maintain a trail. Its name, Mail Ridge, is derived from its use as the route of the mail coach. The canyons of the main Eel and the heavily forested South Fork Eel, now used by the Northwestern Pacific and Redwood Highway, respectively, were not early travel routes.

Ocean transportation was hampered by a lack of good port locations. Humboldt Bay turned out to be the best harbor on the North Coast.

The towns along its shores, dating from the gold rush days, have grown with the over-all economic development of the area.

Crescent City gained prominence as the commercial center and port for the far northwestern corner of California and southwestern Oregon. A road connecting Crescent City and Jacksonville, Oregon, was completed in 1858. Travel up and down the coastal plain was slower to develop. It was not until 1894 that stages began to operate between Eureka and Crescent City. ^{2/}

One early form of outdoor recreation has been described as occurring in the 1850's. It concerns the activities of the Chinese who came to the country almost as soon as the first settlers.

"For recreation the Chinese liked to fly kites; not just children but grownups as well. They made many beautiful kites, some looked like animals and birds."^{10/}

The relative isolation and absence of large population centers in the portion of the North Coast above the Russian River resulted in a much less dramatic type of recreation development than occurred just north of San Francisco. The abundance of the area's natural endowment enabled its residents to include what is now considered outdoor recreation as a part of their normal way of life. Early settlers, like the native Indians, depended on the fish and game resources to supplement their other means of gaining a livelihood.

The railroad also played an important role in the early development of recreation. The earliest railways were really tramways built across the Humboldt Bay mud flats. They were devised to move forest products from high ground to a place where they could be loaded aboard ocean going ships. As the lumber industry expanded, the rail transportation system made corresponding advances.

The Sunday Excursion in the Eureka Area (1884)

Following the opening of the Eel River and Eureka Railroad in 1884, the Sunday excursion came to the Eureka area. In July, two excursions into the interior carried approximately 850 sunshine seeking picnickers apiece.

Coastal Climate Promotes Recreation at Inland Locations

The prevalent coastal fogs, responsible for the outstanding development of the redwood groves, were also responsible for a recreation use pattern that has been brought down to the present. This is the trip inland to a warmer sunnier environment. Early recreation developments on the South Fork of the Eel River predate modern transportation facilities. Place names on maps often identify former locations of family operated resorts such as Eel River Lodge and Wilderness Lodge, near Branscomb in northern Mendocino County. These were patronized by residents of the coastal towns of Fort Bragg and Westport when the lumber industry was booming along the coast. 11/

In the Humboldt Bay area, vacationers considered a wagon trip around the "block" to be a suitable change in environment from the coastal fog belt where they gained their livelihood. This route, requiring about a week's outing, followed the wagon roads up the Van Duzen to Bridgeville, passed through open grazing land to Blocksburg, and eventually crossed the Eel River and returned by the Mail Ridge Stage Road and the redwood groves at the lower Eel. 12/

Early Recreational Use by Non-Residents

Apparently very few non-resident tourists entered the lands north of the Russian River prior to the development of good cross-country trans-

portation facilities. Towns, such as Trinidad, usually included at least one hotel among their list of commercial developments. However, out of town guests were infrequent and the potential for resort development remained untapped.

After the turn of the century, a few hunters began making the voyage between San Francisco and Shelter Cove to utilize the excellent deer hunting that could be found nearby.

Many coastal areas, such as Shelter Cove, retreated to inconspicuous roles following the opening of better overland transportation routes. The growth of recreation use has, nevertheless, been largely the result of the coming of improved transportation and the joining of the Humboldt Bay area, by this means, with the rest of the State.

NOTES: CHAPTER IV

1. Cleland, Robert Glass, "From Wilderness to Empire" (New York), Alfred A. Knopf, 1949, p. 241
2. Millard, Frank B. "History of the San Francisco Bay Region" (1924), p. 79
3. "History of Marin County", Alley, Bowen and Company, 1880

Gives the 1861 population as 3,334

4. Kneiss, Gilbert H., "Redwood Railways, a Story of Redwoods, Picnics, and Commuters" (Berkeley), Howell-North, 1956
5. Pomeroy, Earl, "In Search of the Golden West" (New York), Alfred A. Knopf, 1957, pp. 50-51

A trip to Yosemite Valley was a much more difficult undertaking. From San Francisco, the travelers took a boat ride to Stockton, and then spent two days traveling by stage and one on horseback before reaching the valley.

6. Leuschner, A. O., "Scenic Excursions, Trips Around San Francisco" (1915)

Discusses the merits of the various trips available to the tourist.

NOTES: CHAPTER IV (Continued)

7. Kneiss, op. cit.
8. U. S. Census Reports
9. Chase, Doris, "They Pushed Back the Forest" (Sacramento, 1959),
p. 49
10. Ibid. p. 53
11. From personal conversation with Mr. Heath Angelo who visited the area
while on a recreation trip in 1905 and then returned to settle
12. Thornbury, Delmar L., "California's Redwood Wonderland" (San Francisco),
Sunset Press, 1923

Contains many observations were made while traveling by horse and
buggy through Humboldt County prior to World War I

CHAPTER V. MODERN TRANSPORTATION PENETRATES THE NORTH COAST

The year 1910 found the residents of one-half the land area of the North Coast relying on ocean-going shipping to maintain contact with the rest of the State and the outside world. Many of the open links in the overland transportation system were to be fused closed in the next 50 years. The story of the closing of these links is also the story of the emergence of the North Coast as an area of national as well as local recreational significance.

Railroad Service Unites the San Francisco Bay Area with Humboldt Bay (1914)

The railroads were the first to provide modern overland transportation to the Humboldt Bay area. That the extension of direct railroad service to the Humboldt Bay area was a difficult achievement is attested to by the fact that over 45 years were to pass between the driving of the golden spike at Promontory Point, Utah, and the staging of a similar celebration on the banks of the Eel River. In the meantime, the rest of the State had been united by railroad transportation leaving Northwestern California a last frontier.

By the turn of the century, two railroad developments had made considerable headway against the barriers to further progress. Rail transportation in the south had expanded with the over-all economic development. The San Francisco and Northwestern Pacific Railroad had inaugurated service between the bay area and Ukiah in 1889 and extended the line to Willits shortly thereafter. About the same time, the Eel River and Eureka Railway had expanded the rail system of the Humboldt Bay area to serve the Scotia redwood operations. The intervening terrain posed engineering and financial problems that were not to be resolved for another quarter century.

The rivalry between western rail carriers nearly resulted in two competing lines being built into Humboldt County. The Southern Pacific and the Santa Fe Railroads eventually realized that this course would be to the benefit of none of the parties concerned and, in a rare example of early inter-company cooperation, joined forces in 1906 to form the Northwestern Pacific Railroad. Fifty percent of the ownership was vested in each parent company. Although control of the company eventually passed to the Southern Pacific, the cooperative venture was responsible for the completion of the line linking Humboldt Bay with transcontinental rail service. On October 10, 1914, a golden spike was driven on the banks of the Eel River in a ceremony signifying the completion of construction and the following summer (July 1, 1915), scheduled service was inaugurated between Sausalito and Trinidad.

The Peanut Road (1903)

The earliest highways built by the State resulted from individual acts of the State Legislature. State roads usually consisted of badly needed sections along routes where individual counties could not afford the construction costs. One of these, known as the Peanut Road, was located in the North Coast. In 1903, the Legislature appropriated \$1,800 to survey the route and in 1907 followed with an appropriation of \$50,000 ". . . to connect the roads of Humboldt County with those of Trinity, Shasta, and Tehama Counties." ^{1/} The road formed a 33-mile link through the "Mad River Low Gap" route and connected Eureka with the Sacramento Valley. The route is presently maintained as State Highway 36.

Beginnings of the State Highway System (1909)

A short time before the Northwestern Pacific opened rail service to the Humboldt Bay area plans were drawn for the construction of a state highway including a link running through the North Coast.

The State Highway System originated with the State Highway Act of 1909. This act, when ratified by the people in November 1910, made \$18,000,000 available for highway development. Two routes were located in the North Coast:

1. 371.2 miles from San Francisco to Crescent City
2. 50 miles from Redding to Weaverville

The Act of 1915 added another \$15,000,000 in bonds to supplement the original bond issue and provided \$3,000,000 for additional routes, one of which was in the North Coast:

1. 102 miles from Douglas City to Arcata

The Act of 1919 added \$40,000,000 to the available funds, half of which was to go into the construction of additional routes. Those serving the North Coast were:

1. 212 miles from Tahoe City to Ukiah
2. 40 miles from Crescent City to Oregon Line
3. 24 miles from Santa Rosa to Shellville
4. 47 miles from McDonalds to the mouth of the Navarro River
5. 177 miles from Klamath River Bridge (9 miles north of Yreka) to the mouth of that river
6. 5 miles from Tiburon to Alto 2/

In some sections the new highway was established by turning over to the State existing county roads which were then to be maintained or improved by the State. In other sections entirely new routes were devised thus opening or improving access to new areas.

New State Highway Along the South Fork of the Eel River

One major change from established travel routes took place in the North Coast. Instead of following the existing route from Willits through

Bell Springs and Harris (along Mail Ridge) to Dyerville, the new State Highway was to pass down the canyons of Rattlesnake Creek to the South Fork of the Eel and then follow that stream to Dyerville. In adopting the new route, the state highway avoided two major grades that had resulted in the Mail Ridge being practically impassable during the winter months. The Bell Springs grade, at the south end of Mail Ridge had climbed 2,785 feet in 12 miles. Much of the road was on a 20 percent grade. The north end of Mail Ridge presented even greater difficulties. The road dropped 3,938 feet before reaching Dyerville. Much of the route necessitated 30 percent grades, nearly 1 foot in 3. The new route was planned with a maximum grade of 6 percent. ^{3/} The route had not been developed previously because of the tremendous obstacles to road construction. The canyons of Rattlesnake Creek and the South Fork of the Eel presented major engineering problems.

In addition to providing an all year highway, the new route would bring the traveling public through the splendid groves of coast redwood along the Lower South Fork Eel River. Unlike the big tree groves of the Sierra Nevada or the coast redwood forests of the Santa Cruz Mountains and Marin County, the forests north of the Russian River had not been accessible to the ordinary tourist. The trees of these forests were reknown for their excellence as a source of lumber. Almost as well known was the difficulty of converting cut-over land to agricultural uses. In many places river terrace dairy land may be found that is still dotted with huge redwood stumps, remnants of the early day forests.

John Muir and the National Forest Commission (1896)

Twenty years earlier (September 1896), John Muir and the National Forest Commission ^{4/}, while making a survey of the nation's timber resources,

had visited Humboldt and Mendocino Counties and found that virtually all redwood forest lands had passed into private lands. Muir had been very critical of private logging practices at that time. His often quoted statement: "As timber the redwood is too good to live," ^{5/} was written following his trip through the North Coast with the Forestry Commission.

This comment and other observations applied particularly to the redwood forests from Eureka northward where the forest products could be transported to tidewater for shipment. Muir and the Forestry Commission had bypassed the South Fork of the Eel and its then untouched redwood groves by following the established stage route along Mail Ridge. The picture of the redwood forests that had been conveyed by John Muir's story of the Forestry Commission investigation had not changed significantly by the time modern highways were being extended into the northwest corner of the State.

State Highway Construction Introduces Logging to the South Fork of the Eel

As the state highway construction proceeded down the South Fork of the Eel, the logging industry was brought with it. The construction of bridges was one of the most difficult problems encountered. The area was too remote from transportation facilities to permit the construction of steel bridges; however, the redwood forests were close at hand. Therefore, a sawmill was dragged in to mill timbers for bridges. One of them, the Rock Creek Bridge, 210 feet long and 145 feet high, was constructed with a timber arch of unique design; the only structure of its type in the United States. ^{6/}

The Split Redwood Products Market

Two developments, concurrent with the construction of the state highway, threatened the realization of the recreation and tourist poten-

tial of the new route. The first of these resulted in a heavy demand for split redwood products. Wine grapes had become a dominant agricultural crop in southern Mendocino, Napa, and Sonoma Counties, particularly in Napa and Sonoma Valleys. Split redwood products, such as grapestakes and fence materials, were finding a ready market in the vineyard country. The South Fork of the Eel River was now a convenient source of supply of these products.

The second development also created an increased demand for split redwood products. A shortage of timber had been brought on by the nation's activities during World War I. As a result, the U. S. Railroad Commission had authorized the use of redwood for railroad ties. At that time, ties were manufactured by hand splitting methods.

Logging Versus the Scenic Qualities of the South Fork Eel Highway

As highway construction proceeded, the roadway had to be cleared and graded, and in many places it was necessary to remove trees that could be economically marketed and thus salvaged for beneficial use. Small saw-mills and splitting operations sprang up to carry out this work. With an improved road to use to transport their products, logging spread rapidly through the adjacent private lands. The tall, straight, clear-grained, old-growth redwoods found along the South Fork of the Eel were highly valued in the manufacture of sawed lumber. They were equally desirable as splitters and were well received by those engaged in split products industry. 1/

The threat to the scenic qualities of the new highway was aggravated by the limited funds available for right-of-way acquisition. In 1912 the Highway Commission had adopted a resolution recommending protection of timber growing near roads in the forest districts ". . . to enhance the scenic beauty and attractiveness through wooded portions of California."

In practice the Highway Department operated on such a restricted budget that it was sometimes necessary to allow a landowner to remove and sell all timber from his land prior to transfer to the State in order to obtain the necessary land at the lowest price possible. In some instances lumber companies forsook possible profits to encourage further progress in road development. The Lagoon Lumber Company actually gave the Highway Commission 25 miles of right-of-way 80 to 100 feet wide, with timber, for U. S. 101 between Trinidad and Orick, a section of the highway in northern Humboldt County. ^{8/}

Prominent Citizens Visit the New Highway

Concern over possible loss that would result if the remaining redwood groves in Humboldt and Del Norte Counties were logged had remained latent until the opening of those counties by modern overland transportation. The speed with which logging followed road construction seemed to awaken both local and national leaders to the inherent values of the redwood groves and future international significance that would accrue to the area only if they were preserved.

In 1917, Madison Grant, Professor Henry Fairfield Osborn, and Dr. John C. Merriam ^{9/} visited the South Fork of the Eel where the new highway was under construction. Their trip marks the beginning of efforts by prominent influential citizens to preserve examples of the grandeur of the northern redwood forests by returning part of the privately owned lands to public ownership.

Save-the-Redwoods League Organized

During 1918, Grant endeavored to interest the California Highway Commission in securing a strip of timber along the new highway, but owing

to World War I and other causes, no substantial progress was made until the winter of 1918-19 when Grant and Dr. Merriam succeeded in enlisting the support of a group of public-spirited Californians in forming an organization to be known as the "Save-the-Redwoods League." ^{10/} The league was formally organized in San Francisco in July 1919 with the following officers:

President, Franklin K. Lane
Secretary and Treasurer, Robert G. Sproul ^{11/}
Chairman, Executive Committee, Dr. John C. Merriam

The immediate purposes of the league were stated as follows:

1. To purchase redwood groves by private subscriptions and by county bond issues.
2. To secure a state bond issue to buy the finest redwood groves along the state highways.
3. To establish through federal aid a National Redwoods Park.
4. To obtain through state and county aid the protection of timber along the scenic highways now in course of construction throughout California.
5. To encourage the State to purchase cut-over redwood areas for reforestation by natural means, or by replanting where repeated fires have made sprout reproduction impossible. ^{12/}

The initial successes of the Save-the-Redwoods League resulted, in part, from another visit to Humboldt and Del Norte Counties early in the summer of 1919. At that time, Henry S. Graves, Chief of the U. S. Forest Service, and U. S. Secretary of Agriculture Houston visited those counties and "... impressed upon the people the irreparable loss they were sustaining." ^{13/}

Successes of the Save-the-Redwoods League

The parade of prominent citizens through the North Coast was resumed on August 7, 1919, when Stephen T. Mather, Director of the National Park Service, and Madison Grant, representing the Save-the-Redwoods League, left San Francisco to visit available redwood stands of Mendocino, Humboldt, and Del Norte Counties with reference to the selection of a site for a National Redwood Park. ^{14/} By this time, the people of Eureka were actively engaged in an attempt to preserve the redwoods along the new highway. They had been able to organize the lumbermen operating along the highway and have them agree, for a sum of \$60,000, to suspend operations on lands adjacent to the highway and to give 2 year options for the purchase of their property. The County of Humboldt furnished \$30,000 of this money, and Stephen T. Mather and William Kent donated the remaining funds (\$15,000 each). The chain of events following this visit reached a successful conclusion on June 3, 1921, when the State Legislature appropriated \$300,000 for the purchase of redwood state parks in Humboldt and Mendocino Counties. These funds were supplemented by matching funds accumulated by the Save-the-Redwoods League. The lands so acquired became known as Richardson Grove State Park and Humboldt Redwoods State Park. Humboldt County also appropriated additional funds for the acquisition of roadside area. Thus, as modern transportation united the North Coast, the efforts of national, state, and local governmental agencies, the Save-the-Redwoods League, and public-spirited citizens were necessary to preserve the area's greatest asset, the remaining groves of redwoods -- representative of the optimum development attained by these trees under natural conditions. This effort

was not completed all at once; in fact, it is still in progress. The recommendation made by Madison Grant, following his inspection trip with Stephen T. Mather, that less expensive lands adjacent to the magnificent stands on the redwoods flats be acquired to the ridgetop and a little beyond to protect the environment, would have avoided present danger to the Bull Creek Flat area of Humboldt Redwoods State Park. Here, the Save-the-Redwoods League is presently engaged in the acquisition of the logged-off Bull Creek watershed. Logging operations following World War II left the watershed in a condition that has resulted in excessive runoff from the normally high rainfall. The high runoff causes flooding and stream channel erosion which is now a threat to Rockefeller Forest along Bull Creek Flat of Humboldt Redwoods State Park. Rehabilitation of the watershed and extensive stream bank stabilization measures are now necessary to save this stand.

Although the future of some of the first trees to be "saved" is still in jeopardy, the years following 1921 have seen many additional groves of redwoods added to the State Park System. In the intervening years, the North Coast has gained international recognition as the Redwood Empire.

NOTES: CHAPTER V

1. Ben Blow, "California Highways" (San Francisco, 1920) p. 20
2. "Report on California State Highways" by California State Automobile Association (Northern California) and Automobile Club of Southern California (Southern California, 1921)
3. Blow, op. cit., p. 60

NOTES: CHAPTER V (Continued)

4. The National Forest Commission was appointed by the National Academy of Sciences at the request of Secretary of the Interior, Hoke Smith. The six appointed members included Charles S. Sargent, Chairman (Director of Arnold Arboretum, and Professor of Arboriculture, Harvard University); Professor William H. Brewer of the Sheffield Scientific School at Yale University; Alexander Agassiz; Arnold Hague, Geologist and Member of the National Academy of Sciences; Gifford Pinchot, Chief of the U. S. Bureau of Forestry; and General Henry L. Abbott
5. John Muir, "The American Forests," the Atlantic Monthly, Vol. LXXX, (August, 1897)
6. Blow, op, cit. p. 63
7. At the present time, the split redwood industry usually serves as a valuable supplement to logging operations. Timber that would otherwise be wasted -- windfall or damaged logs -- may be salvaged and put to beneficial use
8. "California Roadsides," State of California, Division of Highways, p. 5
9. Madison Grant was Chairman of the Executive Committee of the New York Zoological Society. Professor Henry Fairfield Osborn was the President of the American Museum of Natural History, New York. Dr. John C. Merriam was a member of the faculty of the University of California, Berkeley, and President of the Pacific Division of the American Association for the Advancement of Science
10. Madison Grant, "Saving the Redwoods," in Zoological Society Bulletin, XXII (September 1919), p. 112
11. Franklin K. Lane was Secretary of the Interior under Woodrow Wilson. Robert G. Sproul was the Chief of the U. S. Railroad Administration
12. Henry Fairfield Osborn, "Save the Redwoods," in Natural History, Vol. XIX, No. 6 (1919)
13. Ibid.
14. Grant, op. cit.

CHAPTER VI. THE AUTOMOBILE AND RECREATION

To the American, the automobile is the symbol of his freedom. It represents his independence and provides the means that permit him to conduct many phases of his life in whatever manner he finds most suitable. The American's exercise of his freedom of choice through the use of the automobile has dominated the pattern of most changes in recreation habits during the last half century.

Influence of Travel by Automobile on Camping

Early day travelers, utilizing stage coach and railroad facilities, generally traveled from town to town and patronized facilities, such as hotels and inns, that had been established for their use. In some cases, when large numbers of tourists or recreation seekers were attracted to a particular area, large hotels or resorts were developed.

On the other hand, those who traveled by horse and buggy often did not utilize private developments. They covered a relatively short distance during a day and usually had to take care of themselves and their horses wherever the end of a days journey found them. Thus, they were more or less self-sufficient and camping at night became a necessary part of their mode of travel. Early day accounts of travel experiences indicate that farmers and ranchers frequently provided room and board to the occasional wayfarer. As long as the guests were few in number the custom was considered western hospitality. In a few localities settlers established wayside inns when they recognized the opportunity to supplement their incomes in this manner.

The advent of the automobile changed the casual and infrequent nature of the occurrence of the tourist in out-of-the-way places. Many of those who traveled by automobile expected to remain self-sufficient and saw no need for utilizing the commercial establishments located in every town of any size.

The impact of the automobile camper on the outdoors was discussed in the Report of the State Forester, covering the period 1917-18.

"As a pleasure vehicle the automobile is serving the very important and desirable function of bringing thousands of people into closer and more intimate contact with the open country. Because of the large amount of such traffic and the fact that an increasingly large number of people are making a practice of camping enroute, the numerous beauty spots, which were originally located along our highways and which furnished ideal conditions for temporary camps, are fast being destroyed."¹

The report explained that as more roads were improved, often leading to new expanses of open country, the number of visitors usually multiplied creating even greater congestion over a larger area. The multiplication of use that often accompanies the improvement of access or the introduction of new facilities is a phenomenon that has continued to compound the problems of recreation area administrators up to the present time.

Initial Development at Humboldt Redwoods State Park

The State became involved in the problem of accommodating tourists in the North Coast as soon as it acquired title to the redwood parks along the South Fork of the Eel River. The Ninth Biennial Report of the State Forester listed the developments at Humboldt Redwoods State Park during 1921-22. The following were included:

1. An electric light system that could be extended into one of the groves if found to be necessary.

2. Sanitary conveniences in three of the groves.

3. A complete water system in two groves.

4. Tables and brick fireplaces for the use of campers and picnickers. 2/

As soon as the redwoods were saved and made available to the public, it became necessary to provide "improvements" to accommodate the ever increasing numbers of tourists and control the use in a manner that would protect the health and welfare of the user while preserving the groves so they could be enjoyed by future generations of visitors.

Need for Indoor Facilities at State Parks

The development of overnight camping facilities did not solve all the problems involved in providing public accommodations. At an early date, the State Forester recommended that a modern hotel facility be provided at California Redwood Park in Santa Cruz County. The motivation for the recommendation was that the "friendly" park ranger had been providing board and shelter for so many important visitors it was feared his ability to perform his appointed job would be hampered. It was also obvious that the friendly park ranger would suffer a personal financial loss unless he charged for his services. The State Forester argued that any appearance of personal profit might create a scandal in a department that already had experienced enough scandal. 3/ The need for indoor facilities was answered by the development of a state park lodge consisting of individual cabins operated by a concessionaire, in connection with a restaurant, and a store.

A similar development was needed when tourists began to visit in the red-wood parks of the North Coast. Richardson Grove State Park provided indoor public lodging at concessionaire-operated cabins until 1960. The growth of private motel and resort developments eventually resulted in ample private facilities capable of satisfying the tourists' needs. No public recreation agency in the North Coast now operate indoor lodging to accomodate the general public.

The Automobile Brings the Recreationist to National Forests

The automobile had resulted in an early impact of recreation use on national forests similar to that experienced on private and state-owned areas. Although federal funds were not specifically appropriated for campground development until 1922, the Regional Forester reported, as early as 1916, that measures were being taken to provide suitable camping facilities. The efforts were directed towards establishing camping areas and developing suitable drinking water and sanitary facilities at these areas.

The rental of summer cabin sites on national forest land was authorized by the act of March 4, 1915. Following the passage of this act, tracts were laid out in many of the forests of Southern California and the Sierra Nevada Mountains. By 1916 one summer home tract had been started on the North Coast. This tract was "... along the South Fork of the Trinity River on the Trinity Forest." ^{4/} The location, Forest Glen in Trinity County, had been opened to public access by the construction of Peanut Road.

Highways and Bridges Replace the Train and Ferry

The growth of automobile ownership and the extension of improved roads resulted in new freedom for the recreation seeker. During the early twenties the popularity of Marin County as a destination for a family outing

or Sunday ride reached a peak in popularity. Marin County, still only sparsely settled, could easily accommodate the crowds of outdoor enthusiasts. The number of ferry boats necessary to serve the public increased until as many as 50 boats were operating on San Francisco Bay at one time. ^{5/} Hiking clubs also gained prominence as Marin County became the playground for the San Francisco Bay Area.

Gradually the ferries began to use more and more space to transport motorists and their automobiles. As this took place, the number of passengers destined for railroad terminals began to decline. Once the highways were extended to the farmers gate, rail freight also began to decrease in volume. Eventually the rail lines began to drop out of the picture -- one of the first to go was the Mount Tamalpais and Muir Woods Railway in 1927. ^{6/}

By 1963 rail passenger service in the North Coast had been reduced to two routes; that of the California Western providing passenger service between Willits and Fort Bragg, and that of the Northwestern Pacific providing passenger service along the section of their line between Willits and Eureka. In addition to regular service over these two routes, seven weekend excursions combining both routes took place in the spring of 1963. The excursions originated in San Francisco and Oakland. Bus transportation was provided to Willits or Fort Bragg and return. The California Western train, known as "The Skunk," is heavily patronized by summer tourists. Two round trips between Willits and Fort Bragg are made daily during the summer months (June 12 - September 13) in contrast to the one daily trip during the balance of the year. The Northwestern Pacific operates between Willits and Eureka on a three-round-trips-a-week schedule.

With the growth in automobile travel, there came a demand for new or improved transportation facilities. Such demands brought about



THE EUREKA

Undergoing repair prior to transfer
to San Francisco Maritime State
Historical Park.

the erection in 1927 of the Bay Area's first high-level bridge, a 4,000-foot long structure across Carquinez Straits. The real flood of automobile travel into the North Coast followed the completion of Golden Gate Bridge. When the bridge was opened to the public in 1937, three redwood logs took the place of the traditional ribbon. These were removed in a log bucking contest signifying the removal of one more barrier between the redwood wonderland and the visitors and residents of the rest of the State.

As the highway system continued to be improved, California's growth resulted in increased dependence on automobile transportation. Widely spaced metropolitan centers generated a great amount of inter-city travel. The growth of suburbs and outdoor living at home was brought on by California's favorable climate and further increased the residents' dependence on automotive transportation. In 1940 California overtook New York as the number one state in total number of automobiles registered,^{7/} and continues to hold this questionable distinction.

The continued growth of automotive travel resulted in one more bridge being constructed in the Bay Area to serve the North Coast. The Richmond-San Rafael Bridge was completed in September 1956. Its opening marked the virtual end of the ferry service that had promoted earlier recreational development of the North Coast.

By 1962 the number of vehicles crossing Golden Gate Bridge had reached nearly 22 million annually with an average daily traffic volume of over 60 thousand vehicles. The greatest number of vehicles to cross the bridge in a single day occurred on August 12, 1962, when 83,255 passages were recorded. This record was established on a mid-summer Sunday when commuter traffic was relatively low. The record Sunday was not

associated with a holiday or three-day weekend. It resulted from the combination of good weather and a crucial game in San Francisco Giant's bid for the National League Pennant. On August 12, 1962, a record crowd of 41,812 crowded Candlestick Park. Also, according to the San Francisco Chronicle's account published the following day -- "The Bay was thick with Sunday sailors ... San Francisco's beaches and parks had some of the heaviest crowds of the season ... and ... Mt. Tamalpais State Park was filled with 6,500 persons by early afternoon." The San Francisco 49'ers had played an exhibition game in Seattle the previous Saturday and had not contributed to the traffic. The normal weekly peaks in daily traffic occur on Friday and Sunday. These peaks are due to motorists going to and returning from resort areas to the north along U. S. 101, and to general weekend or Sunday driving.

The Richmond-San Rafael Bridge accommodated nearly four million vehicle passages in 1962 and the average daily volume totaled nearly 11,000 vehicles. Peak daily traffic takes place on weekends due to motorists traveling to Russian River resorts and other recreation areas in Marin County and along the Redwood Highway.

Carquinez Bridge also experienced its peak use on August 12, 1962, when 66,377 passages were recorded. The average daily traffic in 1962 was nearly 40,000 vehicles. Peak daily traffic also occurs on weekends

The importance of recreation in the use of all three bridges is also indicated by the peak months of travel. July and August contribute the maximum number of vehicle passages in all three cases.^{8/}

Freeway Development

"As 1962 ends, California is the nation's most populous state. Seventeen million Californians today operate nine million motor vehicles -- 1 out of every 15 in the world and 1 out of 9 in the United States -- while driving 70 billion miles a year."

The foregoing summary of motor vehicle registration in California opens the 1962 annual report issue of California Highways and Public Works. Nine million motor vehicles is more than twice the number of vehicles that were registered in California 15 years earlier (1947). The mobility of these vehicles has been maintained by the development of the "California Freeway and Expressway System." The master plan for this system, enacted by the 1959 Legislature, covers a 12,414-mile network of freeways and expressways to be completed by 1980 at a cost of \$10,500,000,000. The system will contain 10 percent of the road mileage of the State and will carry an estimated 60 percent of all California traffic.

Without the freeway and expressway approach, California's automobile traffic would have been one large jam many years before this. Other state and local roadways are also being continually improved. It appears that as our population centers continue to grow, their citizens will not be confined by inadequate highways. The highways will permit circulation throughout the metropolitan centers as well as rapid travel once the cities are left behind.

The master plan for the "California Freeway and Expressway System" includes all of U. S. 101 between San Francisco and the Oregon border, U. S. 299 between Eureka and Redding, U. S. 199 between Crescent City and the Oregon border, and feeder routes through the Clear Lake area and the San Francisco Bay area counties. The important point of this plan is not whether a particular route will ultimately be a six, eight, or more lanes freeway, but that the highway system is being improved to serve the needs of an expanding State. The accelerated highway development that has taken place since World War II has already had a significant effect on the growth

of tourist travel and recreation use in the North Coast. As the over-all highway system continues to be improved, additional recreation travel will be accommodated, especially in the North Coast.

Population Growth

Sometime late in 1962, California became the most populous state in the United States. This has been the result of a high birth rate and immigration from other states. These two factors are expected to result in doubling of the State's population by 1980, as it has every 20-year interval between censuses this century (except for the interval 1930-1950 when the population increased 86 percent). The growth of California's population has had a direct influence on California's recreational use. Californians may be expected to make even more frequent use of outdoor recreation resources, and the State will probably continue to be a vacation destination for the growing population of the rest of the states. The high immigration rate into California of many new residents, that have left friends and relatives behind, will give rise to California visits by those residents of other states.

Visits by Out-of-state Residents

Scenic assets of the State have made California one of the nation's most popular vacation destinations. A recent nationwide survey ^{2/} to determine what vacation activities Americans would pursue, if time and money were no problem, revealed a trip to Hawaii, California, or a European tour as the most popular destinations for the preferred activities (sightseeing, relaxing and loafing, sports activities, and visiting friends and relatives). Most people are not able to ignore time and money problems; however, studies of trends in length of work week and disposable income indicate that the nation's citizens can expect to have more time and money to spend on recreational

pursuits in future years. Estimates of trends of the four items, population, mobility, leisure time, and disposable income, all favor future growth of all forms of recreation activities in the North Coast.

NOTES: CHAPTER VI

1. Professor J. W. Gregg, Landscape Architect, University of California, "The Automobile Camping Ground A New Element in Park Design." An article included in the Seventh Biennial Report of the State Forester of the State of California. California State Printing Office (Sacramento, 1919), pp. 87-90
2. Ninth Biennial Report of the State Forester of the State of California (Sacramento, 1923), p. 63
3. First Biennial Report of the State Forester of the State of California (Sacramento, 1906), p. 37
4. In Sixth Biennial Report of the State Forester of the State of California, California State Printing Office (Sacramento, 1916), p. 47
5. Harold Gilliam, "San Francisco Bay" (1957), p. 135
6. Earl Pomeroy, "In Search of the Golden West," New York, Alfred A. Knopf (1957), p. 130
7. Ibid. p. 223
8. Information concerning traffic on the Golden Gate, Richmond-San Rafael, and Carquinez Bridges was taken from "Report to Department of Public Works on Transbay Traffic Study for Additional San Francisco Bay Crossings," Division of San Francisco Bay Toll Crossings, Department of Public Works, State of California, November 1962
9. "The Gallup Poll" in the Sacramento Union, Friday, January 25, 1963

CHAPTER VII. MARIN-SONOMA HYDROGRAPHIC UNIT

The Marin-Sonoma Hydrographic Unit includes most of Marin County and the portion of Sonoma County that lies south of the Russian River drainage (Plate No. 2).

Pacific Coast Seashore Recreation

The western portion of the hydrographic unit is typified by ocean recreation. The State and the County of Marin have developed access to beaches with day use recreation facilities. Examples of these developments are: Stinson State Beach and Tomales Bay State Park, Drakes Beach, McClures Beach, and Muir Beach County Parks. These coastal parks are heavily patronized by residents of the metropolitan San Francisco Bay area. The Inverness area on Tomales Bay and lands surrounding Bolinas Bay have developed into recreation communities. At the present time boating activity in the area remains at a low level largely because there are few locations suitable for small recreational craft.

A recent study, concerned with the need for developing coastal harbors of refuge, selected sites on Point Reyes (in Drake's Bay) and at Bolinas Lagoon as desirable components in a chain of such harbors extending the entire length of California. The cost of Point Reyes improvements was estimated at \$2,200,000, while the cost of Bolinas Project was estimated at \$6,200,000.^{1/} The Bolinas Project is being studied by the Corps of Engineers to determine justification for a federal harbor project. Development of either or both projects would materially increase participation in boating activities in the coastal area.

Inverness Yacht Club is the principal private boating facility now in operation. Boaters are also included among the patrons of Tomales Bay State Park. (Most of the east shore of Tomales Bay, where boating activities are centered, is in the Russian River Hydrographic Unit.) The Marin Rod and Gun Club is actively engaged in obtaining lands to insure angler access to coastal streams such as Lagunitas Creek.

The Point Reyes National Seashore has been approved by Congress and the National Park Service has opened a field office on the peninsula. Land acquisition is now underway. When completed, the National Park Service will administer approximately 52,500 acres. Twenty thousand acres in the central part of the peninsula will be retained as a ranching area. This use will retain the open space and pastoral atmosphere while permitting private enterprise to continue to make beneficial use of the land. About 33,000 acres will be designated as public-use land. The proposal calls for improvement of the existing road system; improvement of access to beach, ocean, and estuary areas; development of hiking and riding trails; development of beach facilities consisting of bath houses, shelters, comfort stations, food concessions, picnic facilities, potable water, and parking areas. Planned picnic facilities would accommodate 2,000 people at one time. The total campground facilities would add up to 500 camp units.^{2/} When in operation, the peninsula will be one of the major recreation attractions of the San Francisco Bay Area counties.

The popularity of the Marin County coastal areas is reflected in the use figures from the state parks. Stinson Beach was acquired in 1956, but was not open during part of that year. The annual attendance for the last ten years at Stinson State Beach and at Tomales Bay State Park has been summarized in Table 1.

TABLE 1

ATTENDANCE--STINSON BEACH AND TOMALES BAY STATE PARK^{3/}
(1954-1963)

Year	:	Stinson	:	Tomales
	:	Beach	:	Bay
1954		---		70,308
1955		---		85,659
1956		261,981		64,603
1957		589,144		89,683
1958		516,355		104,578
1959		453,347		85,565
1960		423,335		73,613
1961		477,902		85,966
1962		357,557		93,016
1963		356,050		64,069

Mountain Recreation

The Mount Tamalpais country has long been one of the recreation centers of the San Francisco Bay area with sight-seeing, hiking, and pic-nicking long established uses. Prior to 1927, a cog railroad, the Muir Woods and Mt. Tamalpais Railroad, brought recreationists to a point near the summit of the mountain. Early use of the nearby countryside resulted from a great amount of permissive use of private land.

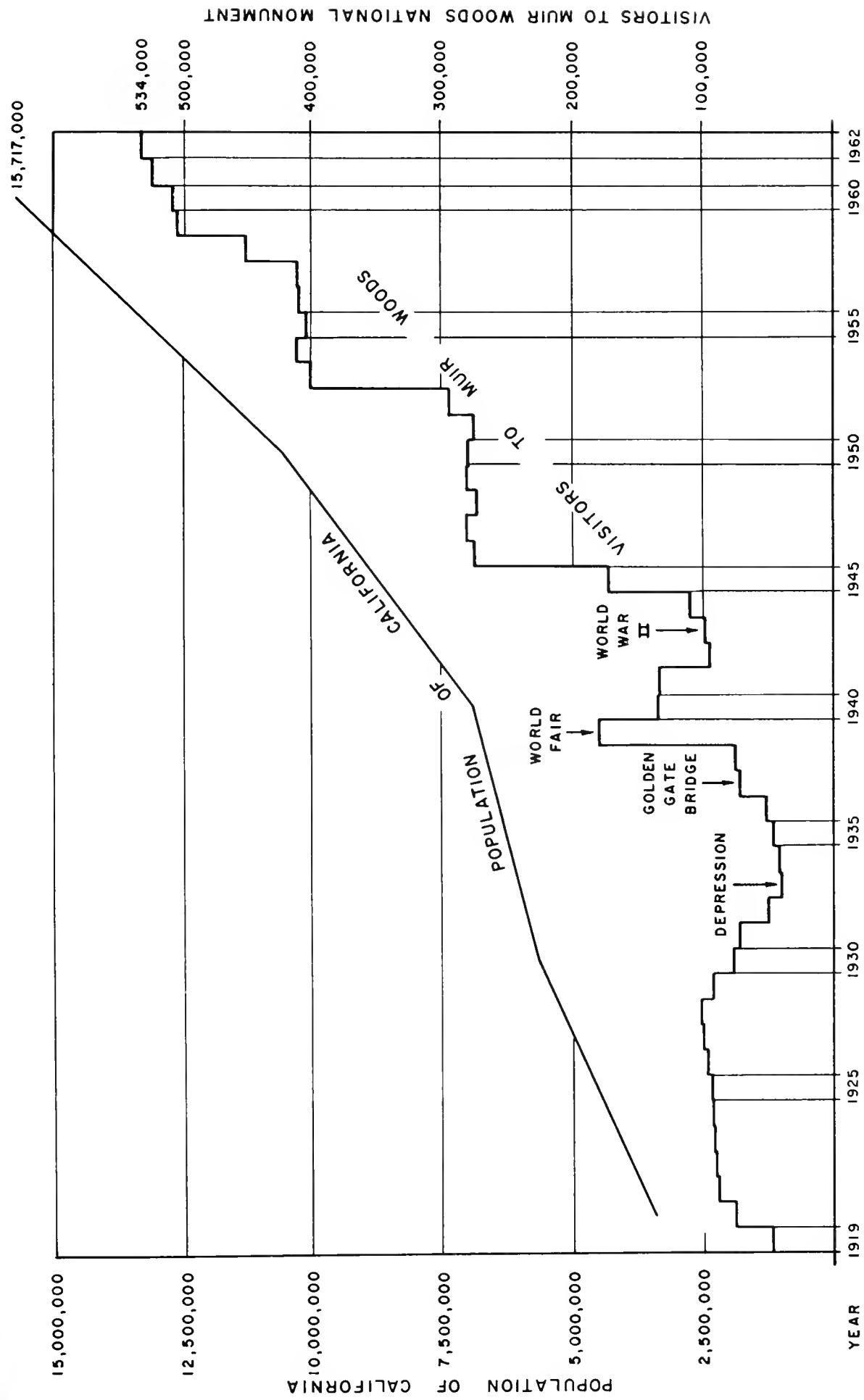
Public ownership and management of Marin County recreation land dates from the establishment of Muir Woods National Monument. The area, totaling 491 acres, was donated to the United States by Congressman William Kent and his wife, Elizabeth Thatcher Kent. Named in honor of John Muir, the monument was established by Presidential Proclamation in 1908. This exhibit of the grandeur of California's redwood forests attracted 534,000 visitors in 1962. The park superintendent estimates that about 20 percent of the visitors sign the register at the park. The majority of those who do sign the register are from other states

or countries. Every month the National Park Service counts the number of foreign countries accounted for in the guest register. During 1962 and 1963, guests from approximately 60 foreign countries visited Muir Woods each month. These records are indicative of the international significance of California's redwood forest preserves. Figure 1 depicts the growth of visitation at Muir Woods and the population growth of California. While guest registers indicate out-of-state visitors constitute a large percentage of the attendance, most of them probably traveled to California because of friends, relatives, cultural developments, or business connections; all elements which are closely tied to California's population.

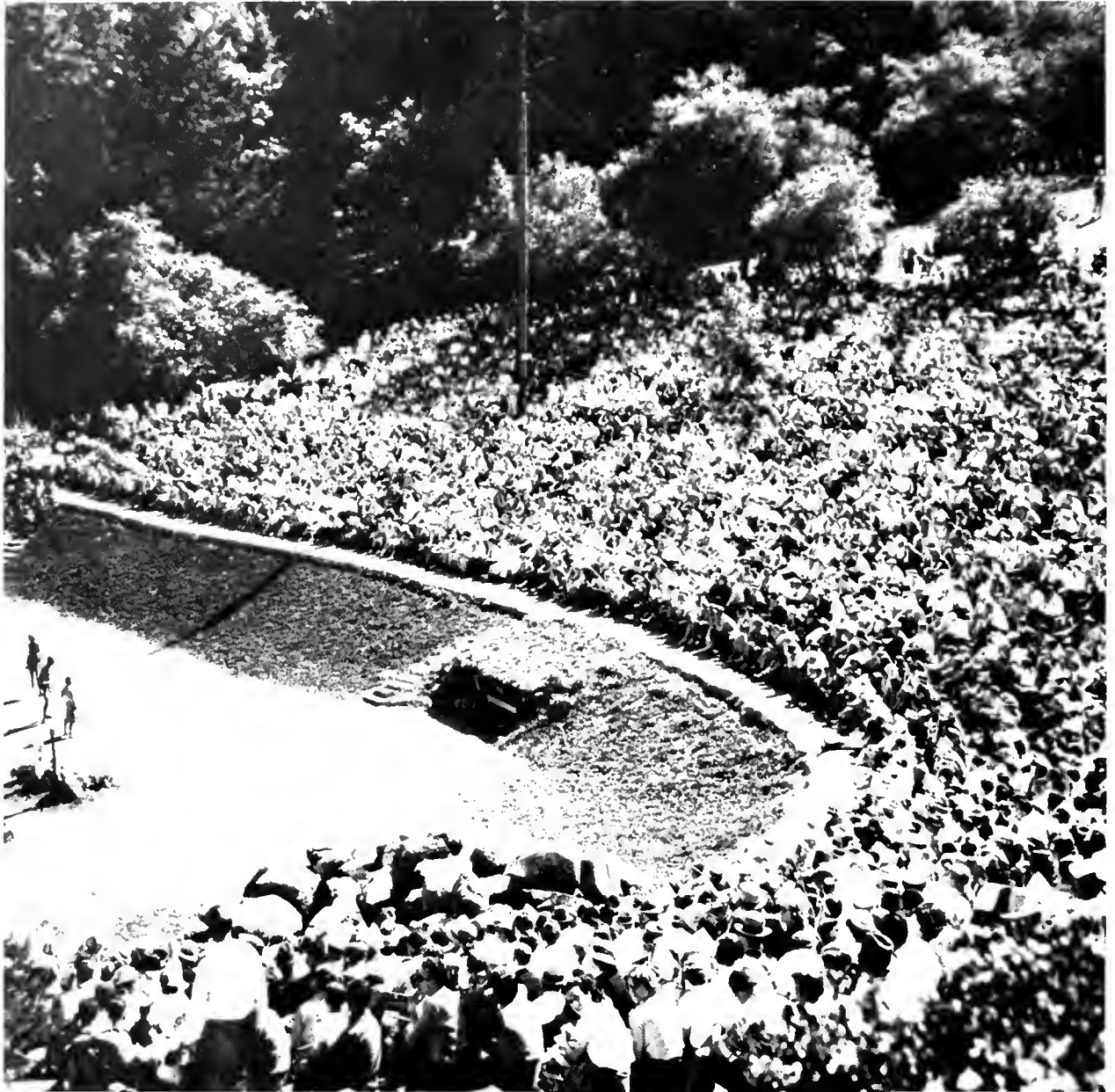
Another important segment of the Mount Tamalpais country that serves outdoor recreation is owned by the Marin Municipal Water District. After the charter for the district was issued on April 25, 1912, the district took over existing companies supplying water in the area, purchased additional watershed, and expanded the reservoir and distribution system.

The reservoir system began with construction of Lagunitas Dam in 1872. Phoenix Dam (built in 1908) was also constructed prior to formation of the district. At the present time the district operates six water supply reservoirs and owns 16,184 acres or approximately 25 square miles of watershed land.

A large percentage of the hiking and riding in Marin County takes place on district lands. The district maintains 110 miles of roads for maintenance work and fire protection. The majority of these roads are open for the enjoyment of hikers and horseback riders. The district also maintains picnic areas for controlled public use where



VISITORS TO MUIR WOODS NATIONAL MONUMENT FOR THE YEARS 1919 THRU 1962
AND
POPULATION OF CALIFORNIA BY DECADE FROM 1920 TO 1960



SIDNEY B. CUSHING THEATRE

MOUNT TAMALPAIS STATE PARK

Growth of the present 2,413-acre park dates back to 1915, when Mr. William Kent deeded the 12-acre site of the Mountain Theatre to the Mountain Play Association.

water contamination is less likely to occur. All lakes are stocked with fish by the California State Fish and Game Department. Fishing is permitted in season every day except Sunday. State fishing licenses are required as well as fishing permits sold by the district. The district permit is issued for \$3.00. Proceeds from sale of district permits are used to offset part of the cost to the water district resulting from recreational use of district lands. Public-spirited organizations such as the Tamalpais Conservation Club (founded the same year as the district -- 1912) also help alleviate the problems (such as trail maintenance) brought on by recreational use of watershed lands. Management of the district's lands provides an excellent example of the beneficial use that may be made of municipal water supply reservoirs and watershed lands.

The third publicly owned recreation development on Mount Tamalpais is the state park by the same name. Growth of the present 2,413-acre park dates back to 1915 when Mr. William Kent deeded the 12-acre site of the Mountain Theatre to the Mountain Play Association. The gift was made with the stipulation that the amphitheater bear the name "Sidney B. Cushing Theatre." Although the site was not part of the original state park, it was later added to the park and improved by the Civilian Conservation Corps.

In 1928 the area known as Steep Ravine, consisting of 204 acres, was deeded to the State of California for park purposes by William Kent. This land was included in the original 892-acre state park when it was established in 1930.



MARIN COUNTY HIKING TRAIL

The trails on Mount Tamalpais cross private land, national monument land, water district land, and state park land.

Visitor-use estimates at Mt. Tamalpais State Park are reported in Table 2.

TABLE 2

ATTENDANCE--MT. TAMALPAIS STATE PARK^{3/}
(1949-1963)

Year	:	Attendance
1949	:	205,849
1950	:	325,883
1951	:	317,526
1952	:	358,826
1953	:	313,003
1954	:	323,894
1955	:	355,856
1956	:	345,730
1957	:	356,514
1958	:	398,994
1959	:	296,620
1960	:	268,510
1961	:	268,000
1962	:	265,800
1963	:	289,389

The trails on Mount Tamalpais cross private land, national monument land, water district land, and state park land. No reliable estimate has been made of the number of hiker-days that occur on these trails.

The lands of all three public agencies are closed to hunting. Overnight camping takes place at designated campgrounds on Mount Tamalpais State Park and on the Marin Municipal Water District lands. No overnight facilities have ever been provided at Muir Woods.

Samuel P. Taylor State Park on Lagunitas Creek (Papermill Creek) also contributes many pleasant days of recreational enjoyment to the total for the hydrographic unit. This 2,576-acre park has

128 improved picnic sites and 55 campsites. Stream fishing and swimming are popular activities, although the opportunity to relax in a pleasant redwood grove adjacent to a live stream is probably the principal attraction. Visitors may use local trails or hike to or from the Mt. Tamalpais region. Since the park was first acquired in 1946, there has been an almost continual expansion and improvement of facilities. More money, nearly \$600,000, has been expended improving facilities at this park than at any other state park in Marin County. The attendance at Samuel P. Taylor State Park has been summarized in Table 3.

TABLE 3
ATTENDANCE--SAMUEL P. TAYLOR STATE PARK^{3/}
(1949-1963)

Year	:	Attendance
1949	:	36,289
1950	:	76,676
1951	:	75,543
1952	:	89,523
1953	:	107,304
1954	:	107,467
1955	:	107,622
1956	:	119,709
1957	:	130,005
1958	:	172,005
1959	:	222,400
1960	:	193,697
1961	:	189,332
1962	:	193,824
1963	:	160,844

San Francisco Bay Recreation

Fishing and boating opportunities available on San Francisco Bay resulted in the early establishment of the Marin-Sonoma bay-shore as a center of boating activities. The first yacht club in

California, the San Francisco Yacht Club, was founded on Belvedere Island in 1869, just two decades after the beginning of the Gold Rush.^{4/} The prominence of the area in the boating field has been maintained to the present day. Marin County ranks well above all other bay counties in per capita ownership of boats over 23 feet. The residents also have a high participation rate of ownership of small and medium size boats.

Richardson Bay is the principal concentration point of boating activities. In 1960, 1,060 boats were berthed on the bay. In addition, the owners of another 1,300 boats stated that this area was their favorite launching site.^{5/}

The San Rafael area berthed 520 boats in 1960. A few boats were berthed at San Pablo Bay points.

Significant increases will occur in the over-all boating use as a result of planned developments on Point San Pedro. These plans include marinas totaling 2,000 berths. San Rafael is also the location of large residential-marina-yacht club development plans.^{5/}

The need for angling access has resulted in three Wildlife Conservation Board projects being constructed in this area. Boat launching, parking, and sanitary facilities were provided on the Petaluma River near Black Point, Marin County, and at Hudeman Slough off Highway 37, Sonoma County. Paradise Beach Pier, on the north side of Tiburon Peninsula, is being rehabilitated.

Lower Sonoma County

The portion of Sonoma County included in the Marin-Sonoma Hydrographic Unit is noted principally because of its place in early

California history and the pleasant vineyard country. The Sonoma Creek watershed gained fame as the Valley-of-the-Moon as a result of Jack London's writings.

The Jack London Historical State Park was opened to the public in September, 1960. In 1962, the second year of full operation, 106,149 visitors were accounted for. Jack London's world-wide fame, as well as the historic significance of other attractions that drew visitors into the area, is reflected in the pages of the visitor register maintained in the "House of Happy Walls" on the 40-acre park. Of those who signed the register, 87.7 percent were residents of California, 10.1 percent were residents of other states, and 2.2 percent lived in foreign countries.

The other state historical monuments located in lower Sonoma County include Sonoma Mission, Vallejo Home, Sonoma Barracks, and the Petaluma Adobe. Available attendance records are presented in Table 4.

TABLE 4

ATTENDANCE--SONOMA COUNTY HISTORICAL MONUMENTS^{3/}
(1953-1963)

Year	Sonoma Mission	Petaluma Adobe	Vallejo Home
1953	61,655	1,886	59,041
1954	64,560	2,508	63,034
1955	46,151	8,629	55,756
1956	46,836	9,280	58,588
1957	51,962	11,057	66,816
1958	54,768	15,858	67,470
1959	59,936	18,740	72,738
1960	59,853	22,630	74,570
1961	64,537	22,617	80,763
1962	73,251	27,533	81,264
1963	72,028	28,461	82,777

Proposed State Water Projects (Plate No. 1)

None of the water development projects included in the North Coastal Area Investigation are located in the Marin-Sonoma Hydrographic Unit; however, the North Bay Aqueduct may have a terminal reservoir located near Novato. Unless water is exported into the area, the principal benefit the residents will receive will be the opportunity to make recreational use of the reservoirs to the north.

• While much of the boating in the Marin-Sonoma Hydrographic Area utilizes the San Francisco Bay and its tributaries, many pleasure boats also use fresh water lakes and reservoirs. About 74 percent of the pleasure boats owned by bay area residents are trailed and 10 percent hauled on top of a car or truck.^{5/} Many of these boats are now used on Lake Berryessa, Clear Lake, and Lake Mendocino. North Coast developments will provide new recreation areas within convenient driving distance from the homes of this already water-oriented population.

NOTES: CHAPTER VII

1. Interim Report on Coastal Harbors of Refuge,
Division of Small Craft Harbors, State of California (January, 1963)
2. Land Use Survey, Proposed Point Reyes National Seashore,
National Park Service (San Francisco, February, 1961)
3. Visitor-day estimates from California Division of Beaches
and Parks records
4. Earl Pomeroy, "In Search of the Golden West", New York,
Alfred A. Knopf (1957), p. 249
5. Data on present boating from: Market Demand for Boating
in the San Francisco Bay Area, Division of Small Craft
Harbors, State of California (May, 1961)

CHAPTER VIII. RUSSIAN RIVER HYDROGRAPHIC UNIT

The Russian River Hydrographic Unit includes parts of Mendocino County, Sonoma County, and Marin County. The majority of land is in the drainage for which the unit was named; however, the portion of northern Marin County draining into Tomales and Bodega Bays has been included into this unit.

Coastal Area

The Russian River Hydrographic Unit includes most of the ocean frontage areas in Marin and Sonoma Counties. These areas are heavily used by boaters. Small boat fishing is one of the popular activities. In 1956, Bodega Bay experienced 7,000 angler-days of small boat fishing. The effort produced 1,896 salmon. The use and catch at Tomales Bay was also significant.^{1/}

About 150 boats were moored in west Marin County in 1960,^{2/} most of them in Tomales Bay. Marin County maintains a Wildlife Conservation Board fishing access boat launching facility at Miller Park on Tomales Bay. Privately operated facilities are available at Dillon Beach.

Bodega Bay is the home port for many recreational boats. At Doran Park on Bodega Bay, the County of Sonoma maintains a small boat launching facility. A study of boat launchings was conducted during the first seven months of 1960. During this study, 1,289 boat launchings took place on the county ramps. Owners of the boats resided in 27 counties of California. Three boats were from Reno, Nevada. The study is summarized in Table 5.

TABLE 5
ORIGIN OF BOATS, DORAN PARK
(1960)^{3/}

Area of origin	: : Number : of boats	: Percent with : origin known
Sonoma	336	28
Other Bay Counties	494	41
Central Valley	342	29
Other, Northern California	10	1
Southern California	14	1
Out of State (Reno)	<u>3</u>	<u>—</u>
Total Known Origin	1,199	100
Unknown Origin	<u>90</u>	
Total Boats	1,289	

Available information and opinions of recreation administrators in the Russian River Resort area lead to the conclusion that the places of permanent residence of other beneficial users of the Lower Russian River are similar to those of users at Doran Park. Most of the use originates from Bay Area residents; however, a significant percentage is composed of Central Valley residents who pursue recreational activities that bring them to the cooler coastal areas.

Bodega Bay, already a heavily used small craft harbor, has been recommended for further improvement in the "California Small Craft Harbors and Facilities Plan" of January, 1963. In connection with any future improvement of Bodega Bay Harbor, Sonoma County plans to improve the small boat facilities at Doran Park. The Pacific Gas and Electric Company is presently constructing an atomic power plant on Bodega Head. The company plans to provide for access and recreational use of a 300-acre area between Bodega Bay and the ocean.

Sonoma Coast State Park, with 59,000 feet of ocean frontage, provides access to most of the coast between Bodega Bay and the mouth of Russian River. The park provides a maintained beach, nine picnic units, parking, and thirty camp facilities. Estimates of visitation at this park have increased from slightly over 100,000 in 1952 to 395,000^{4/} visitor-days in the 1962-63 fiscal year, indicating an increasing popularity of the coastal area.

Russian River Resort Area (Mirabel Park to Jenner)

Lands adjacent to the Russian River between Santa Rosa Valley and Jenner by the Sea include some of the most highly developed and heavily used recreation lands in the State. The mouth of Russian River at Jenner is famous for its winter steelhead and silver salmon runs. The steelhead fishery extends to the headwaters while the silver salmon are restricted to the lower 40 miles of the river.

Summer resorts and recreation developments are centered around Guerneville. Although two recreation districts and one state park are found in the area, most visitors utilize privately owned summer homes or the above-mentioned resort developments. An estimate of 70,000 recreation visitors per week are accommodated during the peak of the summer season^{5/}. Visitors include residents and vacationers from the coastal area who travel inland to find warmer climate and swimming conditions, summer home and resort guests, and day-users from local towns or the San Francisco Bay area, only a 90-minute drive away. Also, significant numbers of visitors are Central Valley residents seeking cooler surroundings than found at home.



A RUSSIAN RIVER SWIMMING BEACH

Property owners along the Russian River have formed Recreation Districts to provide and maintain recreation facilities.

Two recreation districts have been formed to administer the special needs of recreation visitors. Monte Rio Recreation District, supported by about 1,200 property owners, maintains a recreation beach that is used by up to 4,000 visitors a day. Monte Rio Beach has an area of 16 acres and includes a 600-car parking lot. The district provides lifeguards; the number of guards (from 1 to 5) depends on the size of the crowd. Total annual use is probably comparable to that at Stinson Beach in Marin County, about 450,000 visitor-days per year. This use is only a small percentage of the total river and resort use centered around Monte Rio.

The other recreation district, the Russian River Recreation and Park District, provides services in the Guerneville area and also is financed through property taxes. The principal service of the district is maintenance of two recreation dams on the Russian River. The dams are placed in the river during summer months and removed after Labor Day. Thus, they do not interfere with migratory fish, nor do they have to withstand winter flows in the river. The lower dam is located at Vacation Beach and creates a 1-1/2-mile stretch of still water between Vacation Beach and Guerneville. The second dam backs up water along 2 miles of river between Guerneville and Rio Nido. The resulting 4-mile stretch of river with regulated flow is heavily used by adjacent resort and recreation developments. No publicly operated beaches are located along the impoundments; however, many property owners whose taxes support the district operate commercial facilities that satisfy the needs of the general public.

A remnant of the famous Big Bottom stand of redwoods that established timber yield records during early sawmill days has been preserved in Armstrong Redwoods State Park. The park is comparable to Muir Woods in its value as a natural history exhibit; however, limited overnight camping facilities are included in the development. Accurate visitor counts at the park entrance tabulated a total of 250,604 visitor-days in 1962^{4/}. This is about double the number tabulated ten years earlier and corresponds with the experience of recreation district operators. The park use is a small percentage of total recreation use of the Russian River resort area.

The Russian River resort area provides opportunities to relax at pleasant resorts and summer home developments, stream fishing, swimming, and associated activities. Motor boats are allowed on the river, but speed restrictions protect swimmers and eliminate activities such as water skiing.

Utilization of the recreation resources of this naturally endowed country has been hampered by the high winter river flows. Both recreation districts expend considerable effort each spring to rehabilitate their facilities. Some resorts have constructed buildings that can be skidded above the flood zone. Other buildings are constructed to withstand flooding after all equipment and furnishings have been removed and stored. The U. S. Corps of Engineers' Dry Creek Project, now being considered by Congress for appropriation of construction funds should alleviate some of the flooding problems.

Central Sonoma County

The population centers of the hydrographic unit are generally located in the valleys traversed by U. S. Highway 101. The major exceptions are Russian River resort towns.

The City of Healdsburg is located where U. S. Highway 101 from the south meets the Russian River. Here the County of Sonoma maintains a River Beach Park as a memorial to the local war veterans. A temporary summer dam at the park creates a pool of still water about 2 miles long. This body of water is buoyed off into swimming areas and power boat and water skiing areas. Lifeguard service is provided. In 1961, the Healdsburg Chamber of Commerce conducted a survey to determine the place of residence of park users. At the time of this survey, U. S. 101 passed through the park. The new freeway, a short distance downstream, had not been opened to travel. A summary of the results of the survey follows:

TABLE 6

MEMORIAL BEACH, HEALDSBURG, CALIFORNIA^{6/}
SURVEY OF PLACE OF RESIDENCE OF USERS
(Taken on June 18, July 17, and August 20, 1961)

Place of residence	: Number : of users	: Percent
San Francisco Bay (nine counties)	1,405	85
Santa Rosa Area	504	30
San Francisco Bay Area	391	24
Healdsburg City	268	16
Petaluma	123	7
Healdsburg Rural	25	2
Windsor	84	5
San Rafael	10	1
Other (Out-of-State and 49 California counties)	<u>257</u>	<u>15</u>
Total	1,662	100

On August 20, 1961, there were about 1,000 people on the beach. Three interviewers were able to question more than half of those present.

Healdsburg Memorial Beach Park is a key indicator of the influence of population, highway access, and tourist travel on use at a water-associated recreation facility. Most breakdowns of regional areas consider the San Francisco Bay area to include nine counties. Eighty-five percent of the Healdsburg users were from the nine bay area counties. Only the "other" 15 percent resided outside the bay area.

Del Rio Woods Recreation District also maintains a summer dam on the Russian River near Healdsburg. Located in a popular summer home area, the district is supported by approximately 150 home owners. Their dam creates a 1/2-mile long impoundment used primarily as a swimming beach area by cabin and home owners and their guests. Life-guard service protects the swimmers. About 1,000 visitors per week use this development during the summer vacation season. The district estimated that 75 percent of the users are permanent residents of San Francisco Bay area cities.

The largest city in the hydrographic unit, and the county seat of Sonoma County, is the City of Santa Rosa (1962 population - 33,800). The City of Santa Rosa is the principal water customer of the Corps of Engineers' Russian River Project, via the facilities of the Sonoma County Flood Control and Water Conservation District. The project stores water near Ukiah in Lake Mendocino for flood control and water conservation. Releases from the lake are subsequently pumped out of the river gravels by the district at the Wohler Pumping Plant near Mirabel Park. This new supply has permitted the city to use its

old water reservoir for recreation activities. However, the reservoir, Lake Ralphine, a 26-acre lake is also maintained as an emergency water supply and is usually full. Because the water is designated for emergency use, swimming is not allowed on the lake. Nevertheless, the entire shoreline is open to recreational use with sail and row boats allowed to use the reservoir surface. Organized recreation programs include a summer day camp, learn-to-sail classes, and sailing regattas. A concessionaire rents sail and row boats. The California Department of Fish and Game stocked the lake with warm water fish. Santa Rosa Park and Recreation Department estimated that 97,000 visitor-days^{7/} of use took place at the lake in 1962. This figure exceeds the Corps of Engineers estimate of 90,000 visitor-days use for the year of 1962 at Lake Mendocino.

The Petrified Forest

The "Petrified Forest," located about 12 miles northeast of Santa Rosa, has been privately operated as a public attraction since its discovery in 1860. The "forest" is currently proposed for inclusion in the State Park System as it has been repeatedly in the past. Fortunately, the owners have done an excellent job of preserving and maintaining this natural exhibit. The "forest" continues to attract visitors as it has since Civil War days. Although the route to the "forest" is not particularly well marked with signs, large numbers of visitors are recorded annually, including passengers of regularly scheduled bus tours.

The "forest" owners maintain records showing the number of adults who pay the admission fee. Paid admissions for a three-year period are listed in Table 7.

TABLE 7

NUMBER OF PAID ADULT ADMISSIONS
PETRIFIED FOREST

Year	:	Adult admissions
1960	:	53,494
1961	:	51,055
1962	:	53,055

There is a small restaurant and curio store operated in conjunction with the "forest." The owner also maintains picnic facilities at the entrance.

Visitors to the "forest" are encouraged to sign a guest register located in the curio store. During August, 1962, a total of 2,329 visitors registered their name and place of residence. This was equivalent to about 25 percent of the paid adult admissions for the month. Entries included residents of 45 states and 22 foreign countries. Table 8 summarizes the register entries.

TABLE 8

SUMMARY OF REGISTER ENTRIES
PETRIFIED FOREST
(1962)

Residence	:	Visitors	:	Percent of total
Sonoma County	:	72	:	3
Other Eight Bay Area Counties	:	773	:	33
Central Valley	:	223	:	10
Northern California	:	41	:	2
Southern California	:	<u>502</u>	:	<u>21</u>
Total California (40 Counties)	:	1,611	:	69
Other States (44 States)	:	606	:	26
Other Countries	:	<u>112</u>	:	<u>5</u>
TOTAL	:	2,329	:	100

A problem exists in connection with tourist visitation to the "forest." This problem pertains to the State Division of Highways regulations concerning "Billboards" and information turn-off signs directing travelers to the privately owned developments. The regulations in this case are eliminating effective directional signs making it difficult for tourists to locate the "Petrified Forest."

The Geysers

The Geysers, 14 miles East of Cloverdale over a narrow mountain road, were once considered one of the most notable wonders of California. The Geysers have amazed large numbers of visitors (including three of our Presidents) for over a century. The attraction, combining the virtues of a health resort and unusual natural phenomenon, has declined in popularity in recent years. The natural condition of steam vents has been altered by recent development of geothermal steam-operated electric power-generating plants. Apparently, nearly all the escaping steam will eventually be brought under control. This unique method of obtaining electrical energy will probably result in continued sightseeing traffic to the site.

Only limited information is available concerning present visitation. Visitors may sign a guest register; 817 did so during the month of August, 1962. Of those who completed the register entry, 10 percent were from out-of-state, with 19 other states and three foreign countries represented.

Asti Winery

One of the establishments on U. S. 101 that welcomes tourists is the Italian Swiss Colony Winery at Asti. Attendance records at Asti

were considered by the Sonoma County Industrial Development Board as being comparatively representative of the county's over-all tourist traffic. Italian Swiss Colony Wine Company conducted a traffic check between July 14, and July 20, 1962, revealing that 36,043 cars passed the Asti winery during the check, and that about 14 percent of them, or 4,954 cars, stopped at the winery. The number of visitors has shown a steady increase through the years. During 1962 the attendance reflected tourist traffic destined to the Seattle World's Fair. Data from other attractions on the Redwood Highway, as well as State Border Quarantine Stations, also reflected the 1962 Seattle-oriented traffic. Samples of the company's attendance estimates are presented in Table 9.

TABLE 9

ITALIAN SWISS COLONY
VISITORS AT THE ASTI WINERY^{8/}
(1950-1962)

Year	:	Number of visitors
1950	:	101,523
1955	:	144,605
1960	:	210,930
1961	:	206,746
1962	:	327,829

The company also summarized the place-of-origin information that visitors recorded in the guest register. During the week of July 14 to 20, 1962, 15,862 people visited the "Hospitality Rooms," and 62.5 percent of those people signed the guest register. The place-of-origin information is summarized in Table 10.

TABLE 10

PLACE OF RESIDENCE
VISITORS AT THE ASTI WINERY (JULY 14-20, 1962)

Place of residence	Visitors	Percent of total
California	4,830	48.64
Other States	4,729	47.63
Other Countries	<u>370</u>	<u>3.73</u>
Total	9,929	100.00

Lake Mendocino

Lake Mendocino is located on the Russian River 3 miles northeast of the City of Ukiah. The lake was created following the completion in 1959 of Coyote Dam by the Corps of Engineers. This dam and the resulting reservoir is the principal feature of the Corps of Engineers Russian River Project, a multiple purpose project for flood control, water conservation, and recreation. When the reservoir is filled, it impounds a body of water approximately 1 mile wide, 3 miles long, and covering nearly 1,800 acres.

The initial recreation facilities provided by the Corps of Engineers consisted of an overlook area, with picnic and sanitary facilities, and a boat launching ramp. The reservoir received considerable recreational use during the first few years of operation because it was a new reservoir and had been well publicized. Also, the first 3 years of operation were dry years that found many established water bodies drawn down or dry, as in the case of Santa Clara Valley reservoirs.

Provision for and operation of facilities to serve the recreation users have been the subject of much controversy. In 1961,

the Wildlife Conservation Board completed a \$105,000 project at the north end of the reservoir which included a boat launching ramp, parking area, water supply, and sanitary facilities. Mendocino County maintains the Wildlife Conservation Board facilities and a limited number of picnic facilities. Private concessionaires have installed a small marina, swimming beach, and picnicking and camping facilities. The Corps has constructed additional recreation facilities on the east shore. These new facilities, including 75 campsites and 60 picnic sites, were used for the first time during the summer of 1963.

Visitor use at Lake Mendocino is estimated daily by the Corps of Engineers Resident Engineer. Summaries of annual use are available for four years of operation as follows:^{2/}

TABLE 11

SUMMARY OF ANNUAL RECREATION USE
LAKE MENDOCINO
(1959-1962)

Year	:	Visitor days
1959	:	165,000
1960	:	451,000
1961	:	285,000
1962	:	90,000

The Corps of Engineers is planning to provide additional improvements and has estimated that recreational use will increase to 750,000 visitor days by 1965 and to 1,500,000 visitor days by 1970.

Lake Sonoma

A second unit of the Corps of Engineers Russian River Project is being planned for construction on Dry Creek, a tributary entering the Russian River near Healdsburg. The reservoir, to be known as "Lake Sonoma," will be located about 10 miles northwest of Healdsburg. When filled, the lake will have a surface area of 2,840 acres.

The recreation and flood control functions of the reservoir should benefit the great metropolitan population building up in Marin and Sonoma Counties. Reservoir recreation may include boating, water skiing, lake fishing, swimming, picnicking, and camping. Use of the reservoir will apparently be limited by the surrounding steep terrain. The Corps estimate of 850,000 to 1,050,000 visitor days of annual use should be realized at an early date by a reservoir so convenient to such a large metropolitan population.

In addition to reservoir recreation, the project should result in considerable improvement in downstream recreation potential. It has been estimated that the dam will reduce flood crests in Dry Creek by up to 4 feet, and in the Guerneville resort areas by 2-1/2 feet, thus, permitting higher utilization of recreation lands.^{10/}

Proposed State Water Projects (Plate No. 1)

Knights Valley is the site of the only new water development in the Russian River Hydrographic Unit that is being considered in the North Coastal Area Investigation. The recreation aspects will be covered along with other water development plans in a later chapter of this report.

NOTES: CHAPTER VIII

1. Water Projects Branch Report No. 1, Department of Fish and Game, State of California (June, 1962) p. 62
2. Market Demand for Recreation Boating Facilities in San Francisco Bay Area, Division of Small Craft Harbors, State of California (May, 1961) p. 82
3. Data Supplied by Sonoma County Harbor Commission
4. Visitor-day Estimates from California Division of Beaches and Parks Records
5. Jack Long in "Western Sonoma County," an article in Tenth Annual Issue of Sonoma County Wonderland (1962-63), Hoyt Printing Company, Clearlake Park, California
6. Healdsburg Chamber of Commerce
7. Santa Rosa Annual Report (Fiscal Year July 1, 1962 to June 30, 1963)
8. Reported by Manager - Visitor Hospitality, Italian Swiss Colony, Asti
9. Source: Corps of Engineers (San Francisco)
10. U. S. Army, Corps of Engineers "Interim Report for Flood Control and Allied Purposes, Russian River, California, Dry Creek Basin" (San Francisco, October, 1961)

CHAPTER IX. MENDOCINO COAST HYDROGRAPHIC UNIT

The Pacific Ocean is the key component of nearly all recreation activities in this area. Sightseers are attracted by the spectacular ocean frontage, and sportsmen by the ocean and stream fisheries. The year long low temperature (in the low fifties) of the near-shore ocean water makes ocean swimming uncomfortable. Low water temperatures, in turn, result in summer fogs and low air temperatures along the adjacent coast. These elements, combined with onshore winds, discourage the types of activities associated with beach areas in warmer climates.

In general, it may be stated that recreation use results from the scenic, historic, and biological resources of the area.

Tourist Use

Fort Ross State Historical Monument attendance data probably reflect many characteristics of the over-all tourist use of the Mendocino Coast. Total attendance increased from 43,129 in 1951 to 108,592^{1/} in 1961, or 152 percent. Fort Ross' percent increase is somewhat greater than that which occurred at the Italian Swiss Colony Winery on the Redwood Highway at Asti where the increase during the years 1950-60 amounted to 108 percent. However, total visitors at Asti were about double the number at Fort Ross.

At Fort Ross, about half the visitors sign the guest register and indicate their home address. The register pages for the month of August 1962 are summarized in Table 12. They indicate that a much higher percent of tourists traveling on the Mendocino Coast are Californians than was found in the Asti data.



FORT ROSS STATE HISTORIC PARK

Mendocino Coast

TABLE 12

FORT ROSS STATE HISTORICAL MONUMENT
(August, 1962)

Place of residence	:	Percent of visitors
San Francisco Bay Area (nine counties)		43.8
Los Angeles County		14.5
San Diego County		4.0
San Bernardino County		1.6
Riverside County		1.0
Sacramento County		5.1
Fresno County		2.0
Butte County		1.7
San Joaquin County		1.6
41 Other Counties		<u>10.0</u>
Total California		85.3
Other States		12.6
35 Other Countries		<u>2.1</u>
Total		100.0

Another facility heavily patronized by the tourist trade is "The Skunk," a motorcar operating on the 40-mile California Western Railroad between Fort Bragg and Willits.

Coastal Recreation Developments

Several state parks are located along the Mendocino Coast. Unfortunately, they are practically unused during the months of the year when the weather is best; in the spring, especially May, and in the fall, especially October. If leisure time trends follow predictions, outdoor recreationists in the future will have more vacation time to

enjoy these parks during parts of the year which are now receiving low use.

Three of the coastal state parks, MacKerricher Beach, Russian Gulch, and Van Damme Beach are well developed parks offering both day use and overnight facilities. Recent increases in visitation are comparable to that at Fort Ross. Estimates of the use at these three parks have increased 159 percent in about ten years; from 127,645 in 1953 to 320,135 for the twelve months ending in June, 1962.

The origin of campers at Van Damme Beach State Park for the year 1960 is summarized in Table 13.

TABLE 13

RESIDENCE OF CAMPERS
VAN DAMME BEACH STATE PARK
(1960)^{2/}

Place of residence	:	Percent of visitors
San Francisco Bay Area (nine counties)		41
Southern California		20
Sacramento Valley		25
Northern California		<u>5</u>
Total California		91
Out-of-State		7
Other Countries (Canada)		<u>2</u>
Total		100

For the year 1960, campers accounted for 28.5 percent of the estimated attendance at Van Damme Beach State Park.

The California Public Outdoor Recreation Plan, Part II, summarized camper-days at MacKerricher Beach State Park for the year 1958

in terms of camper-days per 1,000 population of county groups. This information is presented in Table 14.

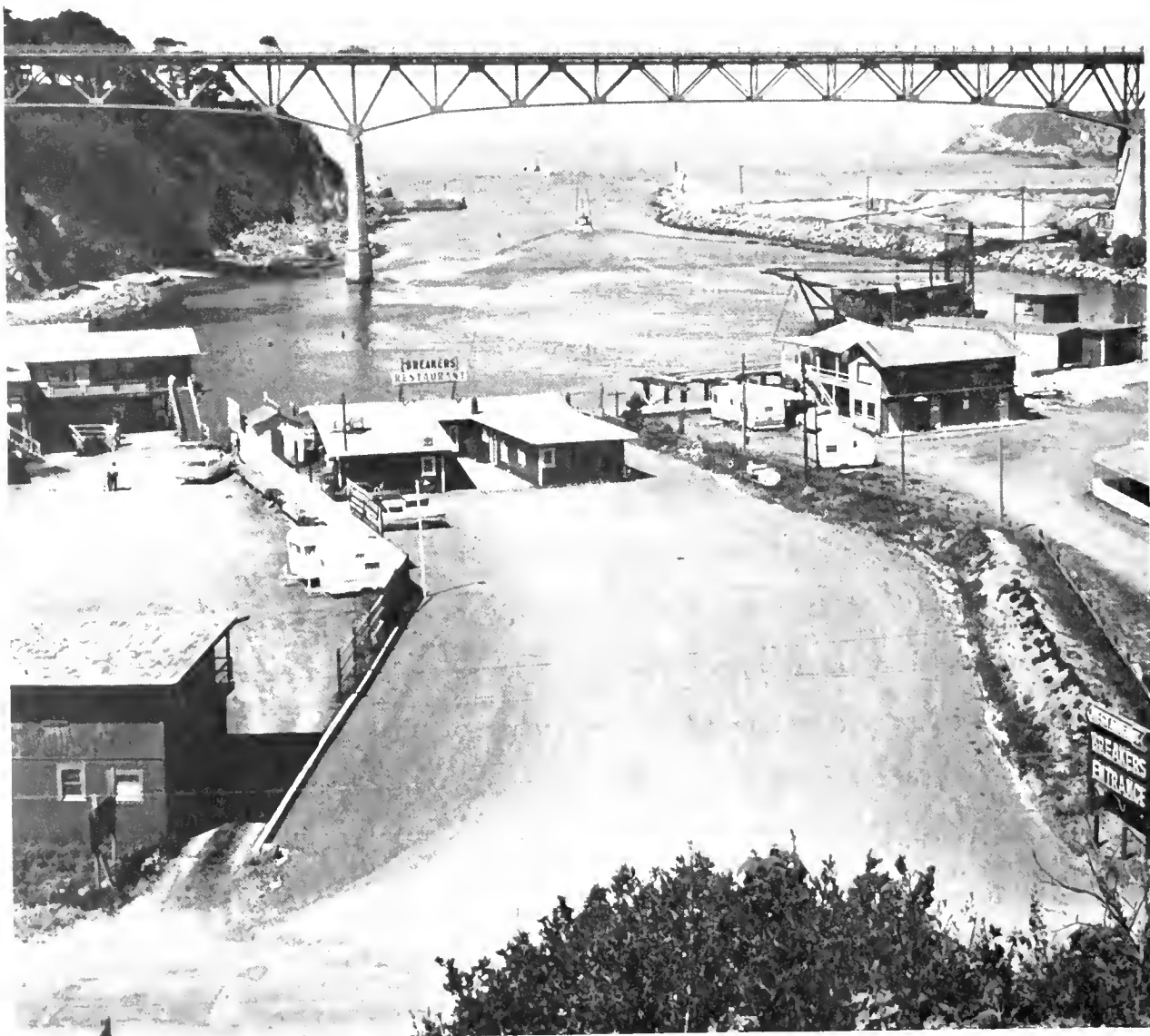
TABLE 14
CAMPER DAYS PER 1,000 POPULATION
MACKERRICHER BEACH/STATE PARK
(1958)²

County group	: Days per : 1,000
North Coast (Counties of Del Norte, Humboldt, Mendocino, and Lake)	14.93
Sacramento Valley Counties	16.46
San Francisco, East Bay, and Marin Counties	2.64
San Joaquin Valley Counties	1.98
Los Angeles and Orange Counties	.78

Table 14 reflects the popularity of this coastal park with nearby residents, and in turn, their high rate of participation in sporting activities associated with the ocean. There is also a heavy visitation to cool coastal developments by residents of the hot Central Valley counties. Visitation from other parts of California decreases as travel distance increases.

In addition to state parks, there are several private developments that accommodate either campers or trailerites. The largest are located at Anchor Bay and Albion. Several smaller private campgrounds are located in the flood plains of coastal rivers and creeks. Motels and hotels report that a considerable portion of their patronage comes from sportsmen.

The increase in tourist and general recreational use has taken place in spite of the decreases in some fundamental resources, such as ocean



NOYO HARBOR
Mendocino Coast

fishing. An example of this decline is that the principal fishing harbor, Noyo, which had eight operating party boats in 1955, had only four in 1961, three in 1962, and only two in 1963. In the mid-fifties most of the fishermen originated from the Sacramento Valley, the Bay Area, and Los Angeles. Poor fishing has been largely responsible for the decline of use by these groups. Another popular activity, abalone fishing, is also suffering from a decrease in abundance of the basic resource. Recent refinements of skin diving equipment, however, have made larger areas of the ocean floor available. Today a skin diver with underwater breathing apparatus does not have to wait for an abalone tide to pursue his sport.

Two Wildlife Conservation Board projects provide angling access to coastal waters. Ocean frontage has been made available at Heeser Drive, adjacent to the town of Mendocino, and another project, South Kibesillah Gulch, 15 miles north of Fort Bragg. Both Wildlife Conservation Board projects are maintained by the County of Mendocino. Several undeveloped sections of ocean frontage are accessible from State Highway 1, especially along the northern portion of the coast.

Inland Recreation Use

Coastal streams are noted for their salmon and steelhead runs. However, use of the inland area is restricted by large private land holdings and limited road access.

The most heavily populated inland area is located in the drainage of the Navarro River. Although it is the first major stream north of the Russian River Resort area, the watershed has received very light recreational use to date. Many of the developments consist of group or organization camps.

One state park is found about 10 miles from the mouth of Navarro River. Paul M. Dimmick State Recreation Area, though only 12 acres in area, is located in an attractive streamside redwood grove. Development includes 28 campsites and 12 picnic sites. The location is subject to flooding by the Navarro River during periods of high winter runoff.

Masonite Corporation tree farms are located in the same vicinity as Dimmick Memorial Grove. The company permits public use of land between the road (State Highway 128) and the river. These lands are also flooded during periods of high runoff.

The two public use areas provide public access to steelhead and salmon fishing opportunities of the Navarro River. The state park provides an attractive camping site protected from coastal winds and fogs, but still cooler than interior valleys. Improvements in the state park are either removed in the winter (tables, food lockers) or constructed of concrete to withstand inundation. The restroom facilities were especially designed for these conditions. The silt rings on redwood trees, often above eye level, testify as to the necessity of these measures.

Farther upstream in Anderson Valley, Hendy Woods State Park, a 607-acre redwood park with 11,000 feet of stream frontage along the Navarro River, now satisfies the needs of thousands of summer vacationers. Acquired in 1958, the improved facilities were opened to the public for the first time during the summer of 1963. Initial development included roads, parking, sanitary facilities, 95 campsites, and 25 picnic sites. Development is planned to permit expansion of facilities as funds become available.

The opening of Hendy Woods State Park should focus public attention on the positive recreation attributes of the coastal drainages.

Proposed State Water Projects (Plate No. 1)

No major water developments are presently proposed for the Mendocino Coast Hydrographic Unit, although all of the larger watersheds have been considered for possible sites of reservoirs that would regulate streamflow and provide releases that would improve downstream habitat for anadromous fish. Bulletin No. 3, "The California Water Plan," May, 1957, indicated several such sites, as well as sites for future development to meet ultimate water requirements.

NOTES: CHAPTER IX

1. Visitor-day estimates from California Division of Beaches and Parks records
2. Compiled by E. Earl, Park Supervisor, Van Damme Beach State Park
3. "California Public Outdoor Recreation Plan, Part II," California State Printing Office (Sacramento, 1960)



LAKE PILLSBURY

Eel River

CHAPTER X. EEL RIVER HYDROGRAPHIC UNIT

Many aspects of the recreational use of the Eel River Hydrographic Unit parallel those of the Russian River Unit. The coastal area supports recreational activities based on biological resources. Inland, the redwood forest attracts large numbers of tourists and also accommodates a large quantity and variety of recreational activities. Lake Pillsbury, a Pacific Gas and Electric Company development, is located near the headwaters of the Eel River. The Eel River Hydrographic Unit also contains significant national forest areas, most of which are administered by the Mendocino National Forest. The Six Rivers National Forest administers the lands in the headwaters of both the North Fork of the Eel River and the Van Duzen River.

Lake Pillsbury

Lake Pillsbury, an artificial lake created by the Snow Mountain Water and Power Company in 1921, is now operated by the P. G. and E. Company to provide water for power. When full, as it is nearly every spring, the reservoir stores 93,724 acre-feet of water and covers an area of 2,280 acres. A study of the reservoir operation during the period 1943 through 1960 revealed that the June 1 reservoir water level was within 1 foot of the maximum elevation in 15 out of 18 years. The maximum drawdown by September 1st took place in the summer of 1959 when the reservoir was drawn down 31.2 feet. The average drawdown level on September 1st amounted to 15.4 feet; a stage of the reservoir which has a surface area of approximately 1,846 acres. The exposed shore between maximum pool and the average September 1st pool would include 434 acres. During the 18-year period the average of the June 1st and September 1st drawdowns amounted to 8.1 feet. The average barren

area exposed as a result of reservoir drawdown is approximately 196 acres.^{1/}
 Selected operational data for Lake Pillsbury is presented in Table 15.

TABLE 15
 LAKE PILLSBURY, LAKE COUNTY
 SUMMARY OF RESERVOIR OPERATION
 DURING RECREATION SEASON
 (June 1-September 1 for the 18-year period 1943-1960)

<u>All years : June 1 : September 1 : Average July 15</u>			
<u>Drawdown</u>			
Minimum	0.0 feet	7.0 feet	
Maximum	3.9 feet	31.2 feet	
Average	.7 feet	15.4 feet	8.1 feet
<u>Surface Area</u>			
Maximum	2,280 acres	2,108 acres	
Minimum	2,212 acres	1,347 acres	
Average	2,273 acres	1,840 acres	2,084 acres
<u>Exposed Shore-difference</u>			
Minimum	0.0 acres	172 acres	
Maximum	68.0 acres	933 acres	
Average	7.0 acres	440 acres	196 acres

Drawdown of the reservoir continues after Labor Day; however, the reservoir shores are usually deserted in spite of the excellent late fall trout fishing. The minimum storage attained in the 18-year period occurred on December 23, 24, 25, and 26 of 1958, when the reservoir was drawn down 50 feet and held only 16,300 acre-feet of water or 17 percent of capacity. The all time record drawdown occurred on December 9 and 10 of 1931, when 10 acre-feet of water remained behind the dam.

Lake Pillsbury offers an excellent example of recreation benefits that may be obtained from a fluctuating reservoir. The principal deterrent to public use is an 18-mile mountain road leading from Potter Valley to the

reservoir shores; however, the opinion has been expressed by local operators that the road results in selective use by vacationing families, and thus, assists a desirable situation.

Lakeside developments include resorts on private land, private campgrounds and cabins on land leased from P. G. & E., and camping and picnicking facilities operated by the U. S. Forest Service. Some summer homes are on private land and some are on sites leased from the Forest Service. Private resorts that offer camping facilities have been very successful even when faced by competition from free Forest Service camps. The Forest Service also is operating one campground where \$1.00 per night is charged for a campsite.

The success of private campgrounds stems from the extra services provided -- convenience to a store, boat dock, fishing and boating supplies, electric outlets, and similar conveniences. Private camps also offer recreational services such as ping pong or horse shoe pits and evening outdoor dances. One very important private service is the opportunity to reserve a camp many months in advance. This permits the family to plan their trip and be assured that their camping site will be available upon their arrival. Many families place their reservation for the following year before ending their visit at Lake Pillsbury.

About 85 percent of the visitors to Lake Pillsbury reach the area via Potter Valley Road. The Forest Service maintains a checking station on this road as a fire prevention and education service. All visitors are requested to register at the checking station. The visitor register provides the basis for visitor use estimates for Lake Pillsbury. The Forest Service found that 132,700 visitor-days of recreation use were spent around or on Lake Pillsbury in 1960.

The origin of visitors was also determined for 1960 and 1961. The 1961 origin by counties was compiled from a sample of 348 registrations at the checking Station and is summarized in Table 16.

TABLE 16

PLACE OF RESIDENCE OF VISITORS, LAKE PILLSBURY (1961)

Place of residence	:	Percent	:	Total percentage
Southern California				4.45
Kern County		.1		
Los Angeles		1.9		
Orange		.4		
San Diego		.2		
Santa Barbara		.05		
Ventura		1.8		
San Francisco Bay				79.7
Alameda County		9.1		
Contra Costa		8.3		
Marin		11.1		
Napa		1.2		
San Francisco		5.9		
San Mateo		13.9		
Santa Clara		8.1		
Solano		2.5		
Sonoma		19.6		
San Joaquin Valley				3.05
Kings County		.4		
Sacramento		2.6		
San Joaquin		.05		

TABLE 16
(Continued)

Place of residence	:	Percent	:	Total percentage
Central Coast				4.8
Monterey County		4.6		4.
Santa Cruz		.2		
Northeastern Counties				1.7
Butte County		.6		
Lake		.5		
Yuba		.6		
North Coast				5.9
Humboldt County		1.0		
Mendocino		4.9		
Total California				99.6
Out-of-State (Washington D. C. and New York)				.4
Total				100.0

Those visiting for one day or part of a day totaled 5.9 percent of the visitors and averaged 3.66 visitors per car.

Visitors who remained at Lake Pillsbury at least one night included 94.1 percent of the sample. In this category the number of visitors per car averaged 3.83 people. Their average length of stay amounted to 4.47 days.

These results were comparable to the results of a study of 1960 registrations made by Forest Service personnel. Their study tabulated visitors by the city indicated as place of address. One example, Los Angeles County cities, totaled 2.83 percent of the visitors versus 1.9 percent in 1961.

In 1960, eight cars out of 2,380 were from out-of-state. The 1961 sample found two cars out of 348 whose drivers gave out-of-state addresses.

Visitor use has also been tabulated in Table 17 by travel distance to reservoir and population of successive travel distance zones.

TABLE 17
TRAVEL DISTANCE OF VISITORS, LAKE PILLSBURY
(1961)

Miles from : residence :	Estimated population : from 1960 census	Estimated : visitor-days :	Visitor-days per 1,000 population
0 - 50	22,270	2,850	128.000
50 - 100	57,741	7,160	124.000
100 - 150	339,806	29,440	86.600
150 - 200	3,573,570	68,420	19.100
200 - 250	1,268,483	11,710	9.230
250 - 300	357,694	6,150	17.200
300 - 350	425,471		
350 - 400	259,545	490	1.890
400 - 450	386,925	160	.413
450 - 500			
Over 500	<u>9,025,699</u>	<u>5,830</u>	<u>.646</u>
Total California	15,717,204	132,210	8.410
Out-of-State		<u>490</u>	
Total		132,700	

The number of visits per 1,000 residents of distance zones at Lake Pillsbury is similar to the same information for Millerton Lake, Eagle Lake, and Nacimiento Lake. The zone rates exceed those for East Park

Reservoir and Lodi Lake in the City of Lodi. The zone rates are less than those for Shasta Lake or Clear Lake in Lake County.

Study of Lake Pillsbury recreation, and comparison with limited information concerning other lakes or reservoirs, supports the conclusion that estimates of recreation development and usage can be based on the suitability of the water body for recreation use and the population within nearby travel-time zones.

Forest Recreation

Most of the national forest land in the Eel River Hydrographic Unit is administered by the Mendocino National Forest. The forest does not receive heavy use at the present time. About one-third of its 400,000 man-days of recreation use is credited to Lake Pillsbury. Another third of its use takes place on other land in the Eel River Hydrographic Unit -- the majority of land in the Covelo and Upper Lake Ranger Districts. (One-third of its use is in the Sacramento River watershed).

The moderate use of Mendocino National Forest is attributable to several factors.

1. There are no major paved roads crossing or entering the forest.
2. Lake Pillsbury is the only significant body of water (with the exception of the 33 surface acre Letts Valley Reservoir in the Sacramento drainage).
3. Most of the roads follow the ridges rather than stream canyons.
4. Logging traffic results in deep dust along most roads.
5. Scattered deer-hunter camps do not include facilities needed by family groups.
6. The practical absence of winter use prevents year around use of facilities.

There are several reasons why this situation is expected to change.

1. A major state highway is being planned to cross from the Sacramento Valley to the Eel River. Forest roads are planned that will open additional land to public use.

2. There are opportunities for development of small fishing and recreation lakes that will attract users to the otherwise ideal mountain environment. One of these, Hammerhorn Lake on the headwaters of the Middle Fork of the Eel, will probably be constructed by the Forest Service and the Wildlife Conservation Board in the near future. The Forest Service is planning timber sales and land exchanges to increase the desirability of future artificial lakes.

3. New roads are planned to provide creek and river access.

4. Logging roads are planned to provide access for future recreation users after completion of the logging operation.

5. Better roads may result in the development of winter sports in locations such as Anthony Peak, where facilities capable of handling 2,000 skiers per day could be established. A Forest Service report prepared by M. M. Atwater in April, 1962 notes that April 1 snow depths on Anthony Peak were consistently greater over the past 4 "snow-drought" years than at the same 6,000-foot elevation in Squaw Valley.

6. Mendocino National Forest is as close to metropolitan San Francisco as the forests of the Central Sierras.

7. State and federal Eel River water projects.

Upper Main Stem Eel River

The Upper Main Eel is characterized by lack of roads or low quality roads, low population, limited access to large private land holdings, hot dry summers, and limited forest growth.

The P. G. and E. Company and Ukiah Lumber Company maintain free campgrounds along the most attractively forested stretch of the river (between Van Arsdale and Lake Pillsbury); however, they are rarely occupied except during the opening week of trout season and during deer season. A few resorts operate in the Van Arsdale area, offering both campsites and cabins. During the summer, swimming in the river is popular. The fall business of the resorts is based on the accommodation of deer hunters, including arranging for hunting privileges on private lands. About 30 private seasonal recreation residences are located on private lands near Van Arsdale.

One high quality family-type resort operates during the summer months at Emandal. Attractions include river swimming, private reservoir fishing, horseback riding, and leisurely family activities. The proposed English Ridge Reservoir would flood Emandal and Van Arsdale (discussed in Chapter XVIII).

The most significant recreation use along the remainder of the Upper Main Eel is associated with the anadromous fishery dependent on fall and winter runs of salmon and steelhead. The Northwestern Pacific Railroad follows the river canyon from Dos Rios to the confluence of the South Fork, and in former years brought guests to resorts located along the river. Few of these resorts remain. At Dos Rios, one establishment remains that still rents rooms to fishermen. Many fishermen drive to the Dos Rios area but spend the night at home or along U. S. 101.

Lands above the canyon of the Eel contain a few guest ranches. Hunting clubs make heavy use of the privately owned range land during deer hunting season.

South Fork Eel River

The South Fork of the Eel River is probably the most famous, although possibly not the most heavily patronized, recreation area in the North Coast. Here, the number one attraction of the North Coast, the redwood tree, is displayed at its best, attracting in excess of a million tourist visitors each year. Access to the redwoods and the South Fork of the Eel from population centers has always involved difficult travel conditions. It is still obvious that construction of the Redwood Highway along the South Fork of the Eel presented considerable engineering problems; however, every year the road system is improved and should be up to freeway standards before many years.

These slow roads, joining the area with distant population centers, have had a limiting influence on private recreation development, while the absence of winter snow sports has resulted in a shorter visitor season than found in many mountain areas. Only a few private resort operators have been able to extend their business activities beyond the three summer months by catering to winter sports fishermen. Many of the other private resort operators feel that their problems have been intensified by fish passage problems at Benbow Dam. The Division of Beaches and Parks is constructing a new fish ladder to assist migratory fish passage over this obstruction.

In spite of objections to Benbow Dam, resort interests in the South Fork of the Eel generally realize that their establishments are not sharing the boom in pleasure boating. The result has been repeated recommendations such as: (1) the Branscomb Dam proposal currently under study, (2) summer dams at Garberville and Scotia Bluffs, (3) that freeway crossings of the South Fork of the Eel be constructed in a manner that will permit

impoundments behind the crossings, or (4) that a recreation reservoir be developed on Hollow Tree Creek.

There are a few high quality overnight accommodations that are continuing to prosper in the South Fork Eel drainage. This is in contrast to the large number of cabin developments dating from the twenties closing their doors to business or waiting for freeway land agents to buy them out.

Tourist travel shows some of the same visitor characteristics found at Asti in Sonoma County. One of the commercial establishments on the South Fork of the Eel River, the "One-Log-House," features a 7-foot high, 32-foot long cabin hollowed out of a 2,100-year old log from a redwood tree. The establishment also includes a curio store selling redwood novelties. No charge is made for inspecting the "One-Log-House." A register is left at the entrance where visitors may sign their name and address. The register pages for the three-week period, August 10 through August 31, 1962, indicate about 20 percent as many people stop at "One-Log-House" as at Asti. However, the origins of those who stopped were quite similar. The comparison percentage-wise with entering cars at Redwood Highway and Smith River State Border Quarantine Stations in 1962 is also close as is shown in Table 18.

TABLE 18

COMPARISON OF CAR ORIGINS
ONE-LOG-HOUSE, ASTI WINERY, BORDER STATIONS (1962)

Place of residence	One-Log-House : August 10-31, 1962		Winery at Asti : July 14-20, 1962		Border stations : all year 1962	
	: Registrations	: %	: Visitors	: %	: Autos	: %
California	2,689	49.45	4,830	48.64	301,674	51.6
Out-of-State	2,450	45.05	4,729	47.63	282,674	48.4
Other Countries	<u>299</u>	<u>5.50</u>	<u>370</u>	<u>3.73</u>	<u>(included above)</u>	
Total	5,438	100.00	9,929	100.00	584,348	100.00



FAMOUS ONE-LOG-HOUSE

A privately owned and operated
tourist attraction on the
Redwood Highway.

Information derived from the register at "One-Log-House" indicated that distance from home did not reduce the frequency of representation to as great an extent as occurred with visitors to Lake Pillsbury. Table 19 offers a summary of registration by Californians at "One-Log-House" and compares registrations from successive distance zones with the population of each zone.

TABLE 19

RELATIONSHIP BETWEEN DISTANCE FROM PLACE OF RESIDENCE
AND FREQUENCY OF VISITS AT ONE-LOG-HOUSE
(August 10-31, 1962)

Miles from residence :	Estimated population from 1960 census :	Number visitors registered :	Registrations per 1,000 population
0-50	14,514	7	.50
50-100	67,576	32	.48
100-150	343,462	80	.23
150-200	1,772,484	468	.26
200-250	1,520,465	300	.20
250-300	1,046,379	233	.22
300-350	473,562	115	.24
350-400	27,406	9	.33
400-450	8,308	4	.50
450-500	-----	---	---
Over 500	10,442,048	1,441	.13
California	15,717,204	2,689	.17
Out-of-State		2,450	
Other Countries		<u>299</u>	
Total		5,438	



VISITOR INFORMATION CENTER
Richardson Grove State Park



STATE PARK NATURALIST CONDUCTED CAMPFIRE
Richardson Grove State Park

Another way of expressing the visitor findings at the "One-Log-House" is to say that the number of registrations from California travel zones tends to be proportional to the population of the travel zone.

Several of California's finest redwood parks are located along the South Fork of the Eel River. Discussions with the administrators of the state parks lead to the conclusion that visitors from different areas of California are distributed by percentage in about the same manner as the population; the characteristic found at the "One-Log-House." The 1962 attendance at the four parks, listed in Table 20, totaled over 2.4 million visitor-days.

TABLE 20

ATTENDANCE, SEVERAL EEL RIVER REDWOOD PARKS (1962)^{2/}

Park	:	Visitor-days 1962
Standish-Hickey		76,751
Richardson Grove		525,791
Humboldt Redwoods		1,776,106
Benbow Lake		50,581

Visitors to the state parks have about doubled in the last 10 years; however, direct comparison of visitor-estimates are not included in this report, because of freeway developments and relocations, addition of park units, and new methods of counting visitors. Approximately 20 percent of the visitors came for formal uses such as camping, swimming, and picnicking, while 80 percent came just to look. In 1963 the four parks contained 529 campsites or 11.6 percent of the 4,568 campsites in the State Park System.



THE AVENUE OF THE GIANTS
Humboldt Redwoods State Park

Boating opportunities, although generally lacking on the South Fork, are popular at Lake Benbow. The lake is filled with gravel debris to the level of the concrete dam. Wooden splash boards placed on the crest of the old dam each summer create a shallow 123-acre lake. In 1962 a total of 1,080 boats used the lake, principally for recreational uses such as water skiing. Unlike other activities along the Redwood Highway, the boaters were found to be local residents. The above information is summarized in Table 21.

TABLE 21
DISTANCE TO RESIDENCE
BOATERS AT LAKE BENBOW^{3/}
(1962)

Distance to residence	:	Number of boats
0-25		426
25-50		75
50-75		109
75-100		414
Over-100		<u>56</u>
Total		1,080

Van Duzen River

The principal recreation resource of the Van Duzen River is based on the salmon and steelhead fishery. The relatively low level of recreational use is reflected in the near absence of recreation developments. The headwaters, in the Six Rivers National Forest, includes only one campground of eight sites. Permanent and seasonal residences are found on much of the private land bordering the river. Probably most of the recreation use is based at these residences. Family-operated resorts and one state park,

Grizzley Creek Redwoods State Park, also contribute to the total recreation complex. Park development includes 33 picnic units and 26 campsites. Recreation activities include river swimming in addition to enjoyment of the excellent redwood forest environment. A total of 21,923 visitor-days ^{2/} were accounted for at the park during the year ending December 31, 1962.

Mattole River

The Eel River Hydrographic Unit includes the Mattole River watershed and lands between the Mattole and the Pacific Ocean. Salmon and steelhead runs in the Mattole River once supported the principal recreation activities in the area; however, the runs have suffered a considerable decrease following recent logging operations in the headwaters.

Deer hunting is still very successful as it was at the turn of the century, when San Francisco hunters traveled to Shelter Cove by coastal schooner to enjoy their sport.

Shelter Cove remains a popular recreation destination, although the visitor now arrives by automobile or light aircraft rather than by sea. The old pier at Shelter Cove has been completely destroyed by the continuous wave action carrying large quantities of drifting logging debris. The site has been proposed for inclusion in a chain of harbors of refuge in the Division of Small Craft Harbors "Interim Report on Coastal Harbors of Refuge," dated January 1963.

Present recreation use at Shelter Cove is based on the change in environment from warm inland valleys, the excellent bottom fish resources, and successful seasonal salmon fishing. The property owner at Shelter Cove maintains a private campground for visitors, who are nearly all family groups. One member of each family must sign the camp register on the first night in camp.

The register does not include the number in the family group or the number of days they remain at Shelter Cove; however, the combined daily cash receipts for camping and day-use parking indicates a total paid attendance of 14,350 visitor-days for the year 1962. Off-season visitors and sight-seers often are not charged a parking fee. A total of 458 of the camp registrations included place of residence. These registrations listed 144 different cities located in 35 of California's counties. Three registrations were by Oregonians, one each from Kansas, New York, and Nevada. The cities occurring on camp registrations most frequently are listed in Table 22.

TABLE 22
MOST FREQUENT CITY OF REGISTRATION
SHELTER COVE (1962)

City	:	Number of registrations
Rio Dell		28
Chico		26
Eureka		24
Sacramento		21
San Francisco		19
Fortuna		17
Ferndale		14
Scotia		11

Registrations by California residents have been tabulated so that the relationship between the frequency of registration and the population of different travel distance zones may be compared. This information is presented in Table 23.

TABLE 23

RELATIONSHIP OF FREQUENCY OF REGISTRATION AND TRAVEL DISTANCE ZONE
POPULATION-SHELTER COVE CAMP REGISTRATIONS
(1962)

Miles from residence	: 1962 Registrations	: 1960 Population	: Registrations per 1,000
0 - 50	24	7,550	3.19
50 - 100	116	95,666	1.21
100 - 150	14	66,521	.210
150 - 200	15	186,927	.0802
200 - 250	162	3,561,706	.0456
250 - 300	79	1,116,928	.0707
300 - 350	18	512,301	.0351
350 - 400	2	132,216	.0151
400 - 450	4	408,626	.00979
450 - 500	0	299,401	---
over 500	<u>18</u>	<u>9,329,362</u>	<u>.00193</u>
Total	452	15,717,204	.0288

The foregoing table does not fully reflect the tendency of valley residents to visit the coast. One example of this, 28 registrations from Sacramento County versus 19 registrations from San Francisco County (two counties about the same distance from Shelter Cove), indicates that visits per resident from Sacramento County are about 2.2 times the number of visits per resident from San Francisco County.

Shelter Cove is included in the Bureau of Land Management proposed "King Range Conservation Area." The proposal provides a plan for multiple purpose management of 51,000 acres between the Mattole River and the Pacific

Ocean, of which 31,500 acres are presently administered by the Bureau of Land Management. Some 21 miles of the State's least accessible seashore will be included. Plans call for extensive permanent scenic and timber access roads, 45 miles of hiking and riding trails, numerous camping and picnicking facilities, wildlife management, and comprehensive forest and range improvements. One key feature is a 13,000-acre primitive area between Kings Peak (elevation 4,087 feet) and the Pacific Ocean. 4/

Coastal Eel River and Humboldt Bay

The towns bordering Humboldt Bay and the Lower Eel River, with a combined population of nearly 80,000, may be considered a minor metropolitan area, second in importance in the North Coast to the San Francisco Bay Area. The City of Eureka, which recorded 28,000 residents in the 1960 census, is the county seat of Humboldt County and the economic capital of the northwest corner of California. This position has necessitated development of accommodations for out-of-town visitors on a year-round basis. The level of development of accommodations and the variety of services exceeds that usually expected in a population center of similar size.

Probably the most significant contribution of the area to the North Coast recreation complex involves the accommodations that are available to the tourist and sportsman. In 1962 the Humboldt County Board of Trade reported that 436 new motel units had been constructed in Eureka alone during the previous 10 years. In addition, the Eureka Inn had completely refurnished and modernized its 160 rooms. Additional multiunit motels were either under construction or planned. Although motel owners and Chamber of Commerce personnel disagree concerning the timing and frequency of lighting of "No Vacancy" signs, they do appear with great regularity.

Overnight accommodations are supplemented by excellent restaurants and miscellaneous attractions associated with Humboldt Bay port facilities, the redwood sawmills, the forests, rivers and ocean. Eureka is a logical overnight stop and resting place for the millions of tourists who visit the North Coast.

A second significant recreation feature of the area concerns recreation activities that are based on the biological resources of the Eel River, Humboldt Bay, and the Pacific Ocean.

The Eel River, noted primarily as a steelhead stream, also receives heavy fishing use during salmon runs. The first catch of salmon is made in the lower river from boats in August. Early run steelhead and half-pounders are found at about the same time. The late steelhead run between November and February attracts the largest number of fishermen. Water temperature and climate practically eliminate many other water-associated recreation activities.

The adjacent waters of the Pacific Ocean are frequented by sportsmen seeking salmon, surffish, and rockfish. Clamming and crabbing also contribute significant numbers of recreation activity days. In 1959, Buhne Point, within Humboldt Bay, was the most important skiff launching site between the Oregon border and Point Conception. During that year, a total of 6,488 skiffs were launched carrying 13,286 anglers. ^{5/} These fishermen spent the majority of their effort trolling for salmon at sea close to the Humboldt Bay jetties. Surf fishing and fishing off the jetties are popular sports fishing activities. Night fishing has furnished subject matter for prize-winning photographs of beaches lined with fishermen catching smelt in the surf with "A" frame nets.

The climate has a significant influence on the activities of coastal residents. Warm inland recreation developments are more heavily patronized by Eureka area residents than would be expected if population and travel time were the only considerations. This characteristic has been evident since the early day horse and buggy trips into the interior and the first Sunday excursions on the Eel River and Eureka Railroad in 1864. One present-day example of this tendency was revealed when Trinity Lake camp registrations were tabulated by place of residence. In 1962, about one party out of eight listed Eureka or Arcata as their home.

Proposed State Water Projects (Plate No. 1)

The Eel River watershed is one of the principal stream systems being considered as a source of future water supplies. Several projects are receiving consideration, and it is probable that one or more of these will eventually be constructed. English Ridge Reservoir on the Upper Main Eel, Spencer and Dos Rios on the Middle Fork of the Eel, Sequoia and Bell Springs in the Lower Eel, and Eaton Reservoir on the Van Duzen River will be discussed in a separate chapter later in this report.

NOTES: CHAPTER X

1. Operation data for Lake Pillsbury were derived from the P. G. and E. Company's "Condensed Capacity Table - Lake Pillsbury" and from monthly storage records also made available by P. G. and E. Monthly storage records had been published under the appropriate year in "Surface Water Supply of the U. S., Pacific Slope Basins in Calif., U.S.G.S. Water Supply Paper"
2. Visitor-day estimates from California Division of Beaches and Parks records
3. From records compiled by L. R. Fisher, Park Supervisor, Benbow Lake State Park
4. "Preliminary Report on King Range Project," U. S. Department of the Interior, Bureau of Land Management (Ukiah, March 1963)
5. Letter by Department of Fish and Game to North Coastal Regional Water Pollution Control Board, (June 7, 1962), p. 11

CHAPTER XI. MAD RIVER-REDWOOD CREEK HYDROGRAPHIC UNIT

Except for a relatively small coastal plain area and even smaller interior valleys, the terrain of the Mad River-Redwood Creek Hydrographic Unit is composed of steep, and for the most part, inaccessible mountains. The maximum elevation of the unit, near the headwaters of the Mad River, is about 5,000 feet.

The drainage basins of Mad River on the southwest and Redwood Creek on the northeast form the bulk of the hydrographic unit. The Mad River, starting at its source in southern Trinity County, flows almost directly northwest through western Trinity County and across central Humboldt County to the Pacific Ocean. The absence of large tributaries and of main stem forks accounts for the long, narrow drainage basin. The gross area of the basin is approximately 500 square miles. Redwood Creek flows from its source in eastern Humboldt County and follows a course roughly parallel to that of Mad River to reach the Pacific Ocean near the northwest corner of the county. This basin is also long and narrow and has a gross area of about 285 square miles. The remainder of the hydrographic unit is composed of the drainage basins of smaller streams flowing directly into the Pacific Ocean between the mouths of the Mad River and Redwood Creek.

Forest Recreation

Nearly all the recreational use of Forest Service lands is accounted for by visits to the Mad River Ranger District of the Six Rivers National Forest. The primary single attraction in the district is Ruth Lake, a reservoir recently completed by the Humboldt Bay Municipal Water District. Ruth Dam began regulating the flow in the Mad River in July, 1961. The



RUTH LAKE

Mad River

following summer the lake received some recreational use, although only limited accommodations were available. The accelerated public works program made possible the development during 1962 of two Forest Service 20-unit campgrounds on the shores of the reservoir. These units, in addition to privately operated marina and boat launching facilities, were available throughout the summer of 1963. During the year 1963 the Mad River Ranger District received 23,300 visitors who accounted for 50,800 visitor-days of recreational use. About 77.5 percent of the use represented recreational use in, on, and around Ruth Lake. The balance of the use was accounted for by hunters who made little use of the lake or nearby facilities. The total recreational use of Ruth Reservoir for the year 1963 is estimated at 39,400 visitor-days.

The 39,400 visitor-days included many types of activities such as swimming, boating, camping, waterskiing, and picnicking. However, the principal element that attracted the visitor to Ruth Lake was the exceptionally good trout fishing found during the first few weeks of the fishing season.

Forest Service personnel estimated that the first two days of the open trout season, May 25 and 26, found about 1,000 visitors at the lake. Fishing was so good that during the four-day Memorial Day weekend, May 30, 31, June 1, and 2, an average of 3,200 visitors per day attended the lake with 95 percent of these people attracted by the fishing. The 12,800 visitor-days estimated for Memorial Day weekend accounted for 32 percent of the attendance for the entire year of 1963. Fishing success declined as the weather and water warmed with the coming of summer. None of the Forest Service counts following Memorial Day weekend found as many as 500 people at the lake. The Fourth of July weekend count reached

475 visitors per day, and the Labor Day count turned up 328 people. A Department of Water Resources interviewer spent four days at Ruth Lake during August, 1963. He found that one of the 20-unit campgrounds was unoccupied for the entire period. Few visitors were found elsewhere around the lake.

The Department of Fish and Game personnel checked the cars leaving the Ruth Lake area on June 2, 1963. During a 5-hour period, 12:30 p.m. to 5:30 p.m., 206 cars were checked. The 527 anglers in these cars had caught 1,665 fish, ranging in length from $7\frac{1}{2}$ inches to 17 inches. The average length was 11 inches.

The phenomenally good fishing found at Ruth Lake is a repetition of events often experienced at recently formed reservoirs. A similar situation was observed in 1962 at Frenchman Reservoir in Plumas County. When new reservoirs inundate lands with a good supply of water-soluble nutrients, the plants and animals that provide food for fish life thrive. The fish in the reservoir grow very fast and supply good fishing for several seasons. After the nutrients have been flushed from the basin, fish production and angler success usually declines. Older reservoirs do not support such exceptional fisheries as have occasionally been found at recently formed reservoirs.

With the passing of time, the extremely heavy use taking place at Ruth Lake during the first few weeks of trout season should decline in relative significance to the total annual attendance. Correspondingly, it should be expected also that with campsites, picnic sites, swimming beaches, boat launching ramps, and other facilities being available, use during the summer vacation season should gradually increase beyond the light use experienced during the summer of 1963.

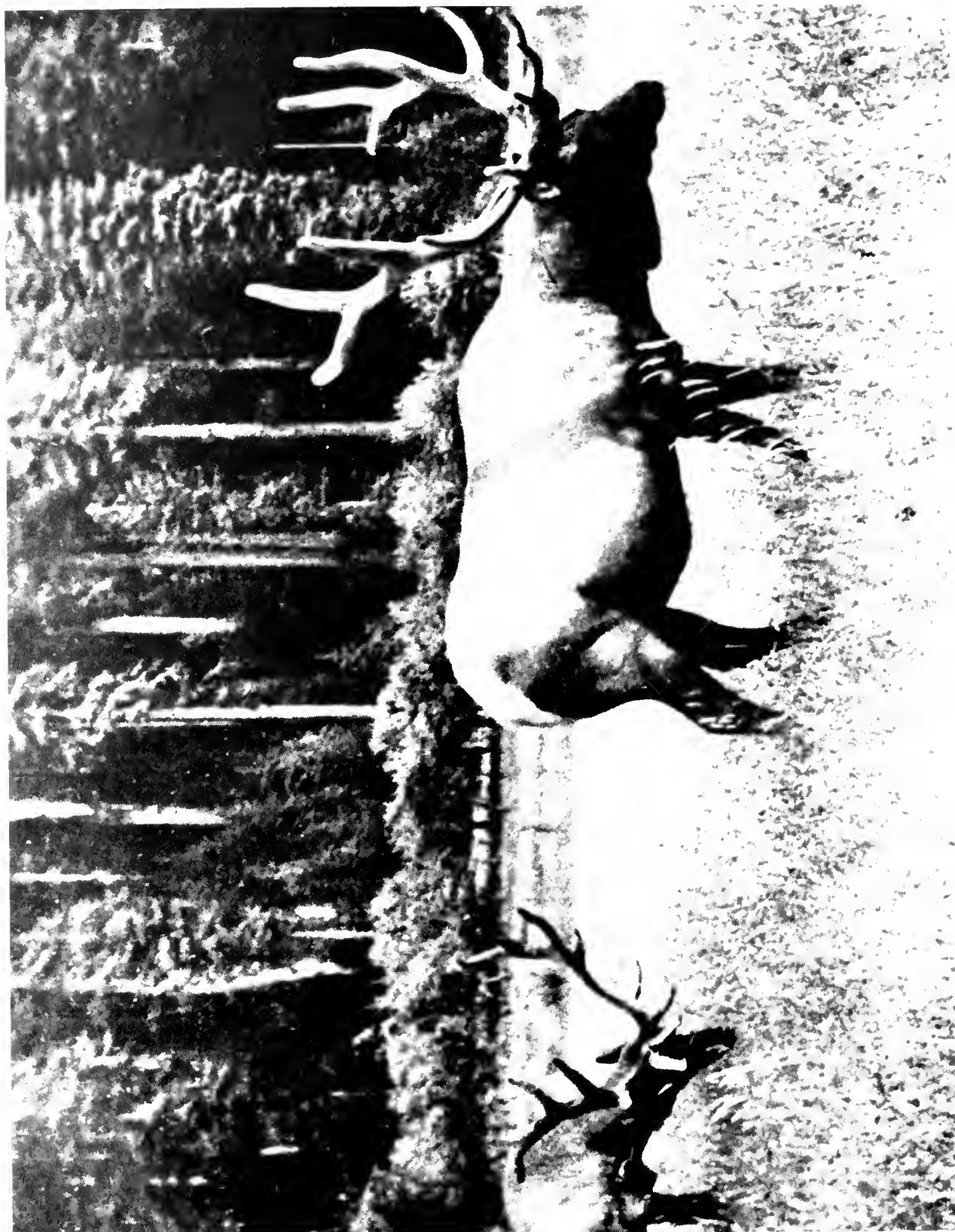
During the summer of 1963, Forest Service personnel conducting a user survey program sampled many elements in addition to the attendance breakdowns cited above. Among the information obtained was the place of residence of the visitors. Table 24 summarizes this information.

TABLE 24
SUMMARY OF PLACE-OF-RESIDENCE
VISITORS TO RUTH LAKE
(SUMMER 1963)

City or area	:	Number of samples	:	Number of people	:	Percent of people
Eureka		18		104		37.4
Scotia		7		41		14.8
Local		3		27		9.7
Hayfork		6		16		5.8
San Francisco		2		16		5.8
Fortuna		3		15		5.4
Redding		4		13		4.7
Arcata		2		9		3.2
Carlotta		1		8		2.9
Rio Dell		2		5		1.8
Los Angeles		1		4		1.4
Santa Rosa		1		4		1.4
Laytonville		1		4		1.4
San Jose		1		4		1.4
Oakland		1		2		0.7
Out-of-State (Oregon)		<u>2</u>		<u>6</u>		<u>2.2</u>
Total		54		278		100.0

Recreation use of the Mad River Ranger District experienced another peak in recreational visitation with the opening of the fall deer hunting season. The Forest Service estimated that 1,890 visitors were in the Mad River District for the opening of the season on September 21 and 22 of 1963.

This bimodal distribution of recreational use, with high use during the opening of fishing season in the spring and during the opening of hunting



ROOSEVELT ELK
Prairie Creek Redwoods State Park
-122-

season in the fall, is typical of many North Coastal area locations. Recreation facilities are heavily used during a few weekends in May and September; however, there are ample facilities to accommodate the vacationing family during the summer months.

Coastal Recreation

Recreational use of lands downstream from the Mad River Ranger District remains at a low use level until the coastal area is encountered. Few roads serve the intervening lands; however, where roads have been extended into the main river, as at Maple Creek on the Mad River, good stream fishing is encountered. The migration of anadromous fish in the Mad River is blocked about 41 miles above the mouth of the river by a 2-mile section of roughs, consisting of large boulders in the channel, with a 25-foot fall at its head.

Included among the most notable recreational features of the coastal segment of the hydrographic unit are Prairie Creek Redwoods State Park; the Lagoons: Big, Stone, and Freshwater; the Mad River estuary; and the Pacific Ocean frontage itself, including Trinidad Harbor, Patricks Point State Park, and the extensive beach area on both sides of the mouth of Mad River.

The two state parks, Patricks Point and Prairie Creek Redwoods, offer well-rounded outdoor recreation complexes. Patricks Point emphasizes scenic ocean frontage, while Prairie Creek Redwoods emphasizes the Coast Redwood and also includes outstanding ocean frontage. One of the attractions at Prairie Creek is the herd of Roosevelt Elk usually found grazing in a meadow adjacent to the Redwood Highway.

Campsites are included in formal developments at both park units. Prairie Creek has 100 improved sites, while Patricks Point development includes 122 campsites. Like most camping developments along the Redwood Highway and State Highway No. 1, the campsites are heavily used throughout the summer months. Most nights find all campsites occupied, and often prospective campers who arrive late in the afternoon or evening are turned away because of a lack of facilities. This is in contrast to the low mid-summer use previously found at Ruth Lake, and also found to occur in many national forest locations such as the Bear Creek area of the Mendocino National Forest, the Yolla Bolla District of the Trinity National Forest and many of the campgrounds along the Klamath River in both the Six Rivers and Klamath National Forests. At these locations, heavy use occurs in the spring when fishing season opens or in the early fall during deer hunting season and the anadromous fish runs.

Like many other recreation attractions in the North Coast, the peak estimated attendance at the major state park units in the hydrographic unit occurred a few years ago. This information is presented in Table 25.

TABLE 25

EXAMPLES OF ANNUAL STATE PARK ATTENDANCE ESTIMATES
MAD RIVER-REDWOOD CREEK HYDROGRAPHIC UNIT

Year	Park Unit	
	Patrick's Point	Prairie Creek Redwood
1953	73,977	77,765
1954	64,443	65,223
1955	74,153	71,209
1956	85,002	150,238
1957	91,890	189,761
1958	142,171	217,643
1959	152,260	240,151
1960	145,222	237,879
1961	147,980	257,327
1962	119,774	238,042
1963	116,469	206,448

Like many other ocean frontage zones in the North Coast, the biological resources of the area provide the basis for a large portion of recreational use. Ocean sport boat fishing activities are centered at Trinidad Harbor. Rock and surf fishing are successfully pursued activities on the ocean front, as well as surf fishing for two species of smelt with a dip net (A-frame).

The major sport fishing area for razor clams in California is located at Clam Beach, a general area extending from south of Strawberry Creek northward to Little River in Humboldt County. Extensive study of this resource has been conducted through Humboldt State College, including censusing of clam diggers during five years (1955, 1958, 1959, 1960, and 1961). The greatest activity occurred in 1958 when 16,050 diggers dug 252,000 clams. The lower side on the success scale was found to occur in 1961 when 4,150 diggers dug 20,725 clams^{1/}. In 1958, only that portion of the beach north of Strawberry Creek was open to diggers, while in 1961 the area south of Strawberry Creek was open to diggers. Much of the northern portion of Clam Beach is included in Little River State Beach, where park personnel have counted as many as 600 parked cars during "clam" tides.

The Mad River Estuary, like most of the major river estuaries in the North Coastal Area, is utilized by anadromous fish during their spawning runs. The California Department of Fish and Game censused the angler use of the estuary by salmon and steelhead fishermen during the fall runs of 1963. Table 26 summarizes the results of this census.

TABLE 26

SALMON AND STEELHEAD ANGLING EFFORT
MAD RIVER ESTUARY
(SEPTEMBER 11 THROUGH NOVEMBER 5, 1963)

Item	Hours	Fish
Shore Angling Effort	3,716.75	104
Boat Angling Effort	<u>5,787.5</u>	<u>439</u>
Total	9,504.25	543

Proposed State Water Projects (Plate No. 1)

Three of the reservoirs studied in the North Coastal Area Investigation are located in the hydrographic unit. Two of the reservoirs, enlarged Ruth and Butler Valley, are discussed in later chapters.

NOTES: CHAPTER XI

1. Allen, George H. and DeWitt, John W., Jr.,
"The Razor Clam Sport Fishery at Clam Beach,
Humboldt County, California, 1955, 1958-1961"
(duplicated about 1962)

CHAPTER XII. KLAMATH RIVER HYDROGRAPHIC UNIT

The Klamath River Hydrographic Unit includes that portion of the drainage of the main stem of the Klamath River located in California between the mouth of the river at Requa, and the point where the river enters the State from Oregon, a few miles above Copco Reservoir. The Salmon River drainage is included; however, the drainage of the major tributary, the Trinity, is considered separately under the Trinity River Hydrographic Unit. Most of the land in the drainages of two other tributaries, Shasta and Scott Rivers, is treated separately as the Shasta-Scott Valley Hydrographic Unit.

The runoff of the Klamath River exceeds that of any river in California, except the Sacramento. The sports fishery accompanying this streamflow has resulted in the river becoming well-known throughout the nation. Probably the most intensively used recreation area north of the Russian River is located on the 7-mile flood plain immediately above the mouth of Klamath River. Above this area the Klamath flows through rugged mountainous terrain for most of the nearly 180 miles between the mouth of the river and its confluence with Shasta River. Above Shasta River, the land is less precipitous than that along the canyon below this point. Copco and Iron Gate Reservoirs are located on the Klamath River south of the Oregon border.

The Salmon River, the principal tributary included in the Klamath River Hydrographic Unit, also flows through a precipitous mountainous territory. The Salmon-Trinity Alps Primitive area and Marble Mountain Wilderness area occupy much of the higher mountains at elevations between 4,500 feet and about 9,000 feet at the headwaters of



TAYLOR LAKE
Klamath National Forest



TRINITY ALPS
Klamath National Forest

Little South Fork Creek. These areas contain some of the finest examples of high mountain wilderness found in California.

Lower Klamath River

The mouth of the Klamath and the first few miles of river immediately upstream provide fishing recreation for more people than any other river mouth in the North Coast. Three species of fish dominate the sportsmen's activities: king salmon, silver salmon, and steelhead trout.

The river is open to fishing year around, and some activity is noticeable during all months of the year. The principal activities are centered around the fall anadromous fish runs. Fishing activity generally starts to pick up during July and reaches a peak during the month of August. Department of Fish and Game counts of fishermen and boats at the mouth of the river recorded the greatest single days activity in 1963 on August 21. Salmon are the principal fish caught during the earlier part of the season. Steelhead trout are more important later in the year. Once heavy winter rains set in, the river becomes turbid and fishing at the mouth and along the lower stretches practically ceases.

Trailer parks and resorts for the accommodation of vacationing fishermen are prominent along the lower 7 miles of the river flood plain. Most of the parks are subject to flooding; however, nearly all of the customers have left prior to the months when floods are usually expected. The State Division of Housing has licensed fifteen trailer parks in this general area. These fifteen parks cater almost exclusively to fishermen. A few parks outside the delta of the Klamath, but



KLAMATH RIVER ESTUARY

One of the heaviest concentrations of recreation users to be found in the North Coastal area occurs along the 7-mile flood plain at the mouth of the Klamath River when salmon and steelhead are passing through the estuary en'route to spawning streams.

within a few miles of the river, rely in part on Klamath River fishermen. The fifteen parks in the Klamath River Delta are licensed to accommodate 753 trailers. During the month of August most trailer parks operate temporarily in excess of licensed capacity. The County of Del Norte Health Department prefers to have the parks accommodate visitors in excess of designed capacity during the temporary period of peak use rather than have overflow crowds camping along roadways and in other unsupervised locations.

Interviews with trailer park operators indicate that there are probably 1,500 camp and trailer parties in the Klamath River Delta at the peak of fish runs. The average size party is about three people per trailer, resulting in a temporary increase of 4,500 residents. Nearly all trailers are used by at least two people. The majority of trailers are occupied by just two people, usually a retired couple who remain at the mouth of the Klamath for several weeks and often return year after year. Occasionally, trailers carry more than two people. During July and August vacationing families are encountered, particularly near Klamath Glen, where tent camping is more prevalent. Klamath Glen is above tidewater and is also sheltered from ocean breezes and fog. The warmer river water and generally more pleasant climate favor family activities such as camping, swimming, and boating. Del Norte County provides lifeguard service at one river beach near Klamath Glen. Boaters and fishermen make considerable use of the first 12 miles of river above Klamath Glen, where it is not possible to follow the river by road. Some of the best steelhead fishing takes place in the roadless area after salmon runs have passed their peak.

The zone of river that accommodates the greatest concentrations of fishermen is located at the very mouth. It is here that shore fishermen line up elbow to elbow, and boats congregate so thick that it appears to be possible to cross the river by stepping from boat to boat. During the summer of 1963, the Department of Fish and Game surveyed this section of the Klamath Estuary. The survey covered 76 days of fishing between July 23 and October 6. Sampling took place during the hours 8 a.m. and 6 p.m. Results indicated that 221,932.6 hours of angling effort took place during the hours represented by the samples. Boat fishermen accounted for 78 percent of the angling effort and shore fishermen for the balance. No attempt was made to expand counts beyond collected data^{1/}.

Recreational use of the entire Lower Klamath River has been estimated for the year 1962. This estimate is based on information and opinions obtained by personal observation, as well as during discussions with personnel from California Fish and Game, California Division of Housing, Requa Chamber of Commerce, camp and trailer parks, and other commercial establishments in the Klamath Estuary. The estimate is presented in Table 27.

TABLE 27

RECREATION USE OF LOWER KLAMATH RIVER (1962)

Item	Month					
	: June	: July	: August	: September	: October	: Other months
Camp and Trailer Parks						
Average number of sites occupied	200	450	750	600	300	21
Overflow	---	---	600	---	---	---
Average daily tents and trailers	200	450	1,350	600	300	21
Tent or trailer days per month	6,000	13,950	41,850	18,000	9,300	4,500
Average size of party	3	3	3	3	3	3
Attendance at camp and trailer parks	18,000	41,850	125,550	54,000	27,900	13,500
Annual camp and trailer park attendance (1962)					280,800	
Hotels, motels, cabins, and lodge attendance					<u>84,200</u>	
Total overnight attendance (1962)					365,000	
Day use (nearby towns, resorts, state parks, etc.)					<u>122,000</u>	
Estimated attendance (1962)					487,000	

Two samples of user origin were taken from 1962 resort records. The first study was based on boat rentals and is presented as an example of the overall origin of Lower Klamath River fishermen. The second sample, taken from trailer registrations, contains only the place of residence of overnight users. These samples have been tabulated according to the distance from the Klamath River at which the individuals residence was located. The frequency of rentals has been compared with population of distance zones in Table 28.

TABLE 28
KLAMATH RIVER ESTUARY
PLACE OF RESIDENCE OF RECREATION USERS
(1962)

Miles from residence	: Estimated : population: 1960 : Census	: Boat rentals : Number : in : sample	: Estimated : average 1962: attendance : per resident:	: Trailer site : rentals : No.in:Percent
0-50	17,771	34	13.88	3.803 No registrations
50-150	104,892	15	6.12	.284 3 2.1
150-200	69,174	2	.82	.0577 2 1.4
200-250	109,249	2	.82	.0365 No registrations
250-300	260,436	3	1.22	.0228 3 2.1
300-350	1,257,108	19	7.75	.0300 9 6.4
350-400	2,993,709	49	20.00	.0325 28 19.7
400-450	558,814	16	6.53	.0569 23 16.2
450-500	303,598	--	--	No registrations 1 .7
over 500	10,042,453	98	40.00	.0194 64 45.0
California	15,717,204	238	97.14	.0301 133 93.6
Out-of-State		7	2.86	9 6.4
Total		245	100.00	142 100.00

Main Stem Klamath and Salmon Rivers

Upstream from the 12-mile roadless area found immediately above the Klamath River Delta are good access roads paralleling the Klamath and Salmon Rivers to the vicinity of their headwaters. State Highway 96 permits travel along 127 miles of the Klamath River between the mouth of Trinity River at Weitchpec and U. S. Highway 99 at the mouth of Shasta River. Consequently, as the salmon and steelhead pass the estuary and proceed upstream, many thousands of additional fishermen derive recreational benefits because of access to the fishery resource.

Recreation use along the Klamath is relatively low during the summer period when many other recreation areas are experiencing

their heaviest use. The family vacation group is not often encountered. There are several possible explanations for the low summer vacation use. The most easily recognized concerns the problem of travel distance to the area. Visits to the middle reaches of the Klamath River requires a greater travel effort by residents of population centers than is required to reach many alternative mountain vacation destinations. A second deterrent to summer use results from the high year around flows. High streamflows appear to limit the frequency of the occurrence of desirable swimming areas such as those found on the Russian and South Fork Eel Rivers. The interior Klamath River system is protected from the cooling ocean breezes; however, in contrast to Sierra Nevada recreation areas, the easily accessible locations along the rivers are found at low elevations, resulting in a summer climate that resembles that of the warm interior basins of California. These three items appear to have limited the popularity of the area during summer months.

The attraction of the fall run anadromous fishery results in an influx of sportsmen. These sportsmen make September the peak month for recreation use in many Forest Service Ranger Districts in the Klamath River drainage. Forest Service personnel conducted a survey of visitors to the Orleans Ranger District in the Six Rivers National Forest, and found that fishing was the primary purpose of 75 percent of the visits. They also found that 75 percent of the visitors had traveled over 100 miles to reach the recreation site.

Ukonum Ranger District in the Klamath National Forest includes the Lower Salmon River near the confluence of that tributary with the

Klamath River, as well as many miles of the latter stream. The primary recreation use in this district is also centered around anadromous fish runs.

Oak Bottom campground was selected as being representative of recreation use along the Salmon River and middle reaches of the Klamath. Located on the Salmon River about 2 miles upstream from its mouth, this campground has 25 well-designed and maintained sites that may be used by either camp or trailer parties. The fire guard at the adjacent ranger station reported that peak day attendance in 1962 occurred on Labor Day weekend when 40 vehicles were counted in the campground. Use continues at a high level throughout the fall fish runs. In contrast, the campground is practically vacant during the mid-summer vacation season. Spot checks during the summer of 1963 found three sites occupied on July 16 and four occupied during mid-day August 6.

Campers at Oak Bottom are requested to fill out registration tags with information pertaining to their visit. Some of the information on 1962 and 1963 registrations has been summarized as follows:

Average Size of Party:

225 registrations included the entry listing which asked for the number of individuals in the group. A total of 677 visitors was listed; an average of three people per camp.

Average Length of Stay:

111 registrations included both date-in and date-out information, for a total of 449 camp nights or an average length of stay of four nights.

User Origin:

Camper visitor-days have been summarized by place of residence and compared to population of the distance zone.

Table 29 relates travel distance and population at travel distance zones to camp registrations at Oak Bottom camp.

TABLE 29

OAK BOTTOM CAMP
 UKONOM RANGER DISTRICT
 KLAMATH NATIONAL FOREST
 (1962-63 Registrations)

Miles from residence	: Estimated : population : 1960 Census	: Camp : visitor- : days	: Percent : of : total	: Attendance in : sample per : 1,000 population
0 - 100	104,892	260	17.0	2.5
100 - 150	42,591	114	7.5	2.7
150 - 200	102,544	57	3.8	.56
200 - 250	99,275	19	1.3	.19
250 - 300	169,376	8	.5	.047
300 - 350	802,097	178	11.7	.22
350 - 400	3,151,154	323	21.2	.10
400 - 450	904,856	117	7.7	.13
450 - 500	709,443	78	5.1	.11
Over 500	9,630,976	335	22.0	.035
Summary	15,717,204	1,489	97.8	.095
Out-of-State		33	2.2	
Total Sample		1,522	100.0	

Klamath National Forest recorded about 200,000 visitor-days use in districts located in the Klamath River Hydrographic Unit in 1962, while Orleans Ranger District in the Six Rivers National Forest totaled 25,000 visitor-days. The sum of these two, 225,000 visitor-days, approximates the recreation use of Forest Service lands within the Klamath River Hydrographic Unit. Recreation use outside of national forest lands in the Upper Klamath and Salmon River drainages includes resorts and summer homes and many activities by local residents. Such use probably equals the recreation activities reported on national forest sites.

Proposed State Water Projects (Plate No. 1)

One reservoir, Humboldt, is considered for development in the North Coastal Area Investigation. Recreation aspects of this proposed development are covered in a later chapter.

NOTES: CHAPTER XII

1. Gibbs, Earl, California Department of Fish and Game, Inter-Departmental Communication, dated October 18, 1963.

CHAPTER XIII. TRINITY RIVER HYDROGRAPHIC UNIT

Trinity River, the principal tributary of the Klamath River, drains a mountainous interior basin with an area of nearly 3,000 square miles. The principal valleys are in the Hoopa Indian Reservation near the mouth of the river, and Hayfork Valley on a tributary of the South Fork.

Road access throughout the Trinity River Hydrographic Unit is generally better than found elsewhere in the North Coast Mountains. U. S. Highway 299 provides access from Redding and the Sacramento Valley to the east and from the Eureka coastal area to the west. The highway parallels the main river for 50 miles. State Highway 36, county, and forest roads provide access to other parts of the drainage.

Wilderness Type Areas

The headwaters of the Trinity River include parts of two wilderness type areas, the Yolla Bolly-Middle Eel Wilderness Area and the Salmon-Trinity Alps Primitive Area.

Nearly 8,000 acres of the headwaters of the South Fork are included in the 109,315 acre Yolla Bolly-Middle Eel Wilderness Area. The balance of this wilderness area is located in the Eel River or Cottonwood Creek watersheds. Roads lead to within 2 miles of the wilderness boundary. Inside the boundary all travel is by foot or saddle horse. The Forest Service maintains a signed trail system to aid the visitor. The largest group of people now using and enjoying this wilderness area are deer hunters.

The Salmon-Trinity Alps Primitive Area includes 223,300 acres of U. S. Forest Service administered land. About 85 percent of this 348 square

mile area is located in the Trinity River drainage. Like the Marble Mountain Wilderness Area in the Klamath drainage, the area is dotted with many sparkling alpine lakes. The bulk of the users are attracted by the primitive conditions and the natural attractions which provide some of California's best in mountain scenery. Cabin, camp, and resort developments are found at several locations near the area boundary. Pack service and guides are also available. Much of the use is by back-packers who often travel with an organized group.

Trinity Lake and Lewiston Lake

The Bureau of Reclamation's Trinity Project brought about the construction of Trinity and Lewiston Dams to control the flow in the upper Trinity and permit the diversion of an average 820,000 acre-feet of water annually into the Sacramento River drainage. Trinity Dam created the principal recreation feature of the project. The resulting Trinity Lake has a maximum water surface elevation of 2,370 feet. At that elevation, the lake has a surface area of 16,400 acres and 145 miles of shoreline. Lewiston Lake serves as an afterbay to Trinity Lake.

Development of recreation facilities at Trinity Lake was initiated while the reservoir was under construction. The principal development to accommodate visitors is located on the Stuart Creek arm of the lake. Here Tannery Gulch campground with 87 individual sites has accommodated the majority of the overnight visitors. Smaller campgrounds are also spotted around the reservoir shore. The U. S. Forest Service has opened a summer home tract on Kinney Ridge and also invited private developers to provide privately operated resort facilities adjacent to the reservoir. Trinity Lake is located off the main travel routes and at a considerable distance

from population centers. Both private and governmental investment in recreation facilities has proceeded at a moderate rate.

The development of recreation facilities at Lewiston Lake is even more limited than at Trinity Lake. A small campground has been set up by the Bureau of Reclamation and U. S. Forest Service. A trailer court established during the construction of the project is now patronized by sportsmen.

Recreation development and use on the two reservoirs is still in its initial stages. Use of Trinity Lake reached measurable numbers during the summer of 1961 when the lake was about one-half full. During 1962, the lake continued to fill with spring of 1963 finding the lake at maximum pool for the first time.

Trinity Lake was constructed in what was already a popular recreation area. The reservoir site was also a very valuable component of the Klamath River drainage anadromous fishery habitat. California Department of Fish and Game personnel estimated in an office report prepared in 1956 that 50 percent of the natural salmon spawning area in the Trinity River was located above the Lewiston damsite^{1/}. The necessary mitigation measures resulted in Lewiston Dam becoming the site of what has been described as the world's most modern fish hatchery. Overall recreation use of the area has increased since the construction of the Trinity project. Table 30 summarizes the recreation use as reported by the Trinity Lakes Ranger District.

TABLE 30

ANNUAL RECREATION USE
TRINITY LAKES RANGER DISTRICT^{2/}
(1958-1962)

<u>Year</u>	<u>Attendance</u>
1958	45,300
1959	23,700
1960	20,300
1961	87,300 (Trinity Lake 50% full)
1962	116,700

The use estimates in the preceding table include visitors other than reservoir users. They are limited to national forest users but probably reflect the result of the impact of the lake on all recreation use of nearby land.

A study was conducted in 1956 to determine the point-of-origin of recreationists visiting the Trinity Lake District^{2/}. The place-of-residence of the campers who filled in campground receipts at Tannery Gulch during 1962 have also been summarized to permit comparison of point-of-origin before and after construction of the reservoir. The boundaries of the user-origin zones are not precisely defined in either summary. This comparison is presented in Table 31.

TABLE 31

TRINITY LAKE DISTRICT
POINT OF ORIGIN OF RECREATION USERS
BEFORE AND AFTER TRINITY LAKE
(1956 and 1962) 3/

Point-of-origin	: Trinity Lake District : Study 1956	: Tannery Gulch : Campground 1962
Local	31.9%	5.8%
North Valley	10.2	24.0
San Francisco Bay Area	35.0	33.2
Eureka Coast	5.0	18.2
Los Angeles Area	7.5	15.0
Other (California)	8.6	3.8
Out-of-state	<u>1.8</u>	<u>---</u>
	100.0	100.0

Campground data, by its nature, does not include many local users. However, the points-of-origin of campers appear to be as widely distributed as were the origins of the people interviewed in the same district in 1956.

The point-of-origin of 1962 campers at Tannery Gulch, Trinity Lake has also been compiled by travel zone and compared to the population of the travel zone in Table 32.

TABLE 32

RELATIONSHIP OF PLACE OF RESIDENCE
TO FREQUENCY OF VISITS TO TRINITY LAKE
DURING 1962

Travel Zone Miles to Residence	: Estimated Population : from 1960 census	: Estimated : Attendance	: Attendance per : 1,000 population
0-50	26,463	2,441	94.0
50-100	49,570	1,989	40.0
100-150	39,867	5,966	150.0
150-200	322,635	1,220	3.80
200-250	925,264	4,434	4.80
250-300	495,963	768	1.50
300-350	1,118,003	1,808	1.60
350-400	898,203	4,995	5.60
400-450	1,396,630	1,672	1.20
450-500	157,196	1,017	6.50
Over 500	<u>10,287,410</u>	<u>7,119</u>	<u>.69</u>
Total	15,717,204	33,429	2.10

Recreation use on the Shasta-Trinity National Forest is dominated by the activities at Shasta Lake, a large artificial lake on the Sacramento River outside the boundaries of the North Coastal Study. The Shasta Lake Ranger District accounts for more than 50 percent of the annual recreation use on the Shasta-Trinity National Forest with most of the district's use associated with Shasta Lake. According to the Forest Recreation Management Plan of the Shasta-Trinity National Forest, "In 1960, of the 709,000 visits

to the forest, 345,000 visits represented the use in, on, and around the shores of Shasta Lake." The continued growth of recreation use at Trinity Lake should place reservoir recreation in an even more prominent position with respect to the overall forest recreation.

Non-reservoir Oriented Forest Recreation

The Yolla-Bolla Ranger District of the Shasta-Trinity National Forest, located in part in the Cottonwood Creek watershed of the Sacramento Valley and in part in the Trinity River watershed, along with the other Ranger Districts of the Shasta-Trinity National Forest that are located in the Trinity River watershed have reported in their annual recreation reports an increase of 40 percent in recreational use during the last 5 years. Low water levels and other problems at Shasta Lake coupled with poor snow ski conditions at Mt. Shasta produced an overall decrease in estimated use for the entire forest during the same period.

A major portion of the non-reservoir recreation use occurs along the Trinity River between Lewiston Dam and the mouth of the river at Weitchpec. This area includes the Lower Trinity Ranger District of the Six Rivers National Forest which reported 46,000 visitor-days of recreation use in 1962. (Thus the total recreation use reported by U. S. Forest Ranger Districts for administered lands located in the Trinity River Hydrographic Unit totaled 325,200 visitor-days in 1962.) A large percentage of the use is dependent upon the anadromous fish runs below Lewiston Dam. Campgrounds along the river are often found to be as heavily used in September and October as during summer vacation months.

Five years records of recreational attendance have been obtained from the Shasta-Trinity National Forest. These records are summarized in Table 33.

TABLE 33

SUMMARY OF ANNUAL DISTRICT RECREATION REPORTS
SHASTA-TRINITY NATIONAL FOREST

Estimated Total Man-days Users of
Recreation Resources 1958-1962

Ranger District	: 1958	: 1959	: 1960	: 1961	: 1962	: Percent : Increase : 1958-62
Trinity River Hydrographic Unit						
Non-Reservoir						
Yolla-Bolla District	35,400	31,000	30,400	48,400	57,200	62
Hayfork-Hyampom District	20,800	27,800	20,900	21,900	20,300	-3
Big Bar District	19,000	18,600	24,900	23,400	27,300	44
Weaverville District	21,500	16,300	23,600	18,900	23,900	11
Coffee Creek District	<u>19,600</u>	<u>12,000</u>	<u>26,700</u>	<u>33,500</u>	<u>33,800</u>	72
Total Non-reservoir	116,300	105,700	126,500	146,100	162,500	40
Reservoir						
Trinity Lakes District	45,300	23,700	20,300	87,300	116,700	158
Total Trinity River Hydrographic Unit	161,600	129,400	146,800	233,400	279,200	73
Sacramento River Basin						
Shasta Lake District	906,900	985,000	797,000	668,700	727,300	-20
Sacramento District	253,000	377,050	330,700	278,000	240,400	-5
McCloud District	<u>47,800</u>	<u>47,850</u>	<u>125,600</u>	<u>36,900</u>	<u>41,200</u>	-14
Total Sacramento River Basin	1,207,700	1,409,900	1,253,300	983,600	1,008,700	-17
TOTAL SHASTA-TRINITY NATIONAL FOREST	1,370,000	1,540,000	1,400,000	1,220,000	1,290,000	-6

The Bureau of Land Management opened a 12 unit campground on public domain land adjacent to the Trinity River near Douglas City in 1963. These well designed units have been so well received that it has been necessary to limit the length-of-stay of the campers to 5 days at a time. The campground continued to receive 100 percent occupancy during September when the salmon began to reach this portion of the river. The Bureau development also includes family and group picnicking units, a swimming beach, and adequate parking.

Recreation use of the Trinity River does not let up during the late fall and winter months. Motel owners report only a 3-month slack period between the end of steelhead season in January and the opening of trout season in May.

Other sections of the Trinity River Hydrographic Unit also experience heavy use during periods of the year outside the 3 month summer vacation season.

The Yolla Bolla Ranger District reports their campgrounds are used at about 75 percent of capacity during May and June, a period during which trout fishermen dominate the use. The opening of trout season is followed by a decline in recreation use during the summer months when campgrounds are used at about 50 percent of designed capacity. Following the summer slack season, deer hunters enter the area during the fall hunting season and recreation sites are used in excess of designed capacity. Peak use on the Yolla Bolla Ranger District occurs in September as a result of its popularity with deer hunters.

During the year 1962, a total of 1,267 deer tags were returned to the Department of Fish and Game by successful hunters who indicated their buck was taken from either the Weaverville or Hayfork herds, the two "herd"

classifications that include most of the Trinity River Hydrographic Unit.

Hunter's county of residence is summarized

TABLE 34

DEER HUNTER'S COUNTY OF RESIDENCE
TRINITY RIVER HYDROGRAPHIC UNIT 4/
1962

County of Residence	Number of Tags	Percent of Total
Trinity	474	37
Shasta	266	21
Humboldt	185	15
Alameda	34	3
Tehama	25	2
Other	<u>282</u>	<u>22</u>
Total California	1,266	100
Out-of-state	<u>1</u>	
TOTAL	1,267	

The Department of Fish and Game reported that while most deer taken in the Hayfork herd are taken by local residents, the area has been increasing in popularity with hunters from other counties.

There are some recreation sites in the Trinity River Hydrographic Unit that offer exceptions to the dominance in the recreational use pattern of spring and fall fishing and hunting. One such site is located at Deerlick Springs on the Yolla Bolla Ranger District where more than 50 percent of the District's improved camp sites have been placed. The 43 site Forest Service campground is operated on a concession basis in conjunction with

the adjacent privately owned campground, trailer park, and cabin facilities. The development has been termed a health resort; however, the principal activity is leisurely camping in a coniferous forest adjacent to a running stream at the 3,000 foot elevation. Trout fishing is also popular with the visitors, many of whom are retired people who return to Deerlick Springs each summer. The combined private and public facilities operate at capacity from late June until early September. The road to the Forest Service camp is usually maintained in passable condition until the close of deer season in early November. However, the private facilities are available to the public from May 15 until October 15 unless unusual weather forces other opening or closing dates. A sample of registrations produced the following information:

Average length of stay -- 16.3 days

Average size of party -- 2.5 people

California residents -- 96 percent

Additional information has been summarized and presented in

Table 35

TABLE 35

RELATIONSHIP OF PLACE OF RESIDENCE TO
FREQUENCY OF VISITS TO DEERLICK SPRINGS (1962) 5/

Miles from residence	: 1960 travel zone population	: 1962 zone attendance	: Attendance per 1,000 residents
0-50	9,706	1,092	113.
50-100	102,018	9,283	91.0
100-150	299,121	14,470	48.4
150-200	693,725	2,457	3.54
200-250	1,116,783	4,095	3.67
250-300	3,064,589	4,914	1.60
300-350	230,926	819	3.55
350-400	571,573	273	.478
400-450	218,357	---	---
450-500	384,712	273	.710
Over 500	<u>9,025,694</u>	<u>1,092</u>	<u>.903</u>
Total California	15,717,204	38,768	2.47
Oregon		1,365	
Nevada		<u>273</u>	
Total Attendance for 1962		40,406	

Forest Service personnel believe that many of the undeveloped recreation sites in the district are as suitable for recreation use as the Deerlick Springs location. The federal government is making substantial improvements to the primary highways and forest roads. The U. S. Forest Service is regulating forest practices in an effort to preserve desirable recreation locations and prevent their damage by logging operations. Future years should find South Fork Trinity River headwaters a popular recreation area.

Tourist Travel

The Trinity River Hydrographic Unit is bisected by U. S. Highway 299, an east-west route across the Coast Range that connects the Sacramento Valley at Redding with U. S. 101 on the coast near Eureka. Weaverville Joss House State Historical Monument, located in Weaverville, the Trinity County seat and largest town in the hydrographic unit, is a well maintained and publicized attraction on this route. The visitors to the historical monument are probably representative of a cross section of the tourist travel over this route. The place-of-residence of visitors who signed the register at the historical monument during the month of August 1962 have been used as a sample of the annual use in deriving the following table.

Non-Californians who visit the Weaverville Joss House total 9.5 percent of the visitors, a greater percentage than found at any of the recreation sites sampled in the hydrographic unit but considerably below the percentage of non-residents accounted for on the Redwood Highway. The information concerning place-of-residence has been summarized in Table 36.

TABLE 36

WEAVERVILLE JOSS HOUSE
STATE HISTORICAL MONUMENT
DISTANCE TO VISITORS PLACE
OF RESIDENCE (1962)

Miles from residence	: Estimated population from 1960 census	: Estimated registrations	: Registrations per 1,000 population
0-50	69,174	2,184	31.6
50-100	25,305	294	11.6
100-150	237,052	3,738	15.8
150-200	198,503	714	3.60
200-250	927,585	3,066	3.31
250-300	3,171,604	8,652	2.73
300-350	831,781	1,386	1.67
350-400	625,224	714	1.14
400-450	220,570	42	.190
450-500	303,668	---	---
Over 500	<u>9,106,738</u>	<u>8,358</u>	<u>.918</u>
California	15,717,204	29,148	1.85
Out-of-state		2,856	
Other Counties		<u>206</u>	
TOTAL 1962		32,210	

Proposed State Water Projects(Plate No. 1)

Several of the proposed State Water Projects would effect recreation use in the Trinity River Hydrographic Unit. Helena and Burnt Ranch Reservoirs would create long narrow lakes in the canyon of the Trinity River. Humboldt, near the mouth of the Klamath River, would back water up the main stem of the Trinity past the mouth of the South Fork. If these projects were all constructed, the main stem of the Trinity River would become a continuous series of reservoirs, stairstep fashion, from the existing Trinity Dam to the mouth of the Klamath River. Eltapom Dam would form a lake in Hyampom Valley to divert South Fork Trinity water into main stem Trinity reservoirs. Other projects following Eltapom would divert Van Duzen and Mad River waters into Eltapom and the Trinity River diversions. A later chapter will consider the recreation impact of each project.

NOTES: CHAPTER XIII

1. Hallock, Pelgen, and Fisk, "Fish, Game, and Recreation in the Klamath River Basin of California," (Sacramento, December 1956).
2. "Shasta-Trinity National Forest Recreation Management Plan."
3. Information summarized from Campground receipts.
4. Memorandum from Gene L. Gerdes, Game Manager II, California Department of Fish and Game dated July 24, 1963.
5. Compiled from register maintained to record collection of fees and to assure delivery of mail to non-fee paying visitors.
6. Compiled from visitor register maintained by California Division of Beaches and Parks personnel.



DWINNELL RESERVOIR

Shasta River

CHAPTER XIV. SHASTA-SCOTT VALLEY HYDROGRAPHIC UNIT

Shasta-Scott Valley Hydrographic Unit includes the 800 square miles of land drained by the Shasta River as well as Scott Valley and the upper tributaries of the Scott River.

Wilderness Type Areas

Marble Mountain Wilderness Area lies astride the western rim of Scott Valley, and the South Fork of the Scott River has its origin in the Salmon-Trinity Alps Primitive Area. The nearness of these wilderness type areas is one of the principal recreation assets of the unit. Several packers with headquarters in Scott Valley provide packing services for visitors to the nearby mountainous country.

Dwinnell Reservoir

Dwinnell Reservoir, constructed in 1928 on the headwaters of the Shasta River, is the only body of water of considerable size in the hydrographic unit. The reservoir is operated by the Montague Water Conservation District; however, all the lands adjacent to the reservoir are included in privately owned ranches. No formal developments are found on the shores of the reservoir. In the past the landowners have permitted recreation users to trespass on their lands. There is some doubt as to whether this permissive trespass will be permitted to continue in the future. A survey^{1/} of 313 parties during 1958 found that 86 percent of the visitors were Siskiyou County residents. Principal activities were trout and bass fishing as well as boating and water skiing. The heaviest use in 1958 occurred during the month of May. A total of 93 cars at a time have been counted on the reservoir shore. When full, the reservoir has a surface area of

1,850 acres. Normal operation of the reservoir results in heavy drawdown as summer progresses.

Deer Hunting

The Shasta-Scott Valley area is also popular with deer hunters. Klamath National Forest reported hunting as the number one "primary purpose of visit" in 1962. Siskiyou County ranked number three among the counties of California in respect to total number of bucks killed in 1962.

Fishing and the Effect of Proposed Water Projects

Both the Scott and Shasta Rivers receive heavy use by trout fishermen; however, the Scott is better known as an early run steelhead stream. The section of the stream between Fort Jones and the Klamath River is particularly valuable for this activity. Much of the trout fishery is actually supported by juvenile steelhead. Although the North Coastal Area Investigation does not propose the construction of any projects in the Shasta-Scott Valley Hydrographic Unit, the construction of the Humboldt Project would eliminate the salmon, steelhead, and juvenile steelhead fisheries in the tributaries above the reservoir because the young fish probably would not be able to find their way through a reservoir as large as the proposed Humboldt during their downstream migration.

NOTES: CHAPTER XIV

1. Reiner, "Shasta Valley Investigation, Dwinnell Reservoir Recreational Use, 1958" California Department of Fish and Game, 1958.

CHAPTER XV. SMITH RIVER HYDROGRAPHIC UNIT

The Department of Water Resources treated many aspects of the Smith River Hydrographic Unit in Bulletin No. 94-4, "Land and Water Use in Smith River Hydrographic Unit," and studies conducted to support that bulletin. The following description of the unit was largely taken from the economic study supporting Bulletin No. 94-4.

General Description

The Smith River Hydrographic Unit is located in the extreme northwest corner of California and encompasses an estimated gross area of 500,500 acres. The boundaries of the basin are the Pacific Ocean on the west, the Siskiyou Mountain Range on the east, the Oregon line on the north, and the Klamath-Smith Divide on the south. The entire unit is within the confines of Del Norte County and is contiguous with the Klamath River Hydrographic Unit on the east and south. In the process of conducting this investigation, the small portions of the Rogue and Winchuck Rivers located in Del Norte County were treated as being in the Smith River Hydrographic Unit, as are several coastal basins of which Elk Creek is the largest.

The hydrographic unit is predominately a forest region as is the bulk of the North Coastal Hydrographic Area. Fully 95 percent of the gross area, or 475,000 acres, is classifiable as forest land. The remaining 25,000 acres of the basin are classed as nonforest land. Approximately one-fourth of this area is barren; one-fourth grassland, and one-half cultivated, urban, and industrial. This nonforest area is concentrated

in one area in the northern coastal portion of the unit and is bounded by Elk Creek Valley, the flood plain of the Smith River, and the area draining into Lake Earl.

Public ownership of lands within the unit accounts for approximately 370,000 acres or 74 percent of the gross land area. Of these public lands, the federal government controls all but about 15,000 acres. The U. S. Forest Service has an estimated 340,000 acres under its jurisdiction in the portions of the Six Rivers and Siskiyou National Forests located within the hydrographic unit. Almost the entire eastern three-fourths of the unit is national forest lands. Other federally-owned lands include about 13,000 acres of public domain and 1,000 acres of Indian Service Reservation or allotment lands. The remaining 15,000 acres of public lands are owned by the State and are comprised of three state parks, all in or adjacent to the coastal plain. Of the estimated 130,000 acres of private lands, at least one-half is commercial timberland, primarily redwood.

The topography of the hydrographic unit is quite variable and can be divided into two more or less distinct regions. The coastal plain extends along almost the entire coast, but only becomes of significant width in the north half of the unit. In the latter area, this gently sloping region averages about 4 to 6 miles in width, with elevations ranging from sea level to about 200 feet. A striking feature of this coastal region is a large tidal lagoon called Lake Earl, which is about 4 miles long by $1\frac{1}{2}$ miles wide, and perhaps averages 10 feet in depth. The lake is blocked off from the ocean by a barrier beach throughout most of the year, and is located several miles north of Crescent City. The other topographical region forming the Smith River Unit is a portion of the Klamath complex of mountain ranges. In proceeding from west to east the elevations continue

to increase until the eastern boundary of the unit and Del Norte County are reached on the main crest of the Siskiyou Range. On this eastern divide the peaks average more than 5,000 feet in elevation, and the highest point in the drainage area is found here on Bear Mountain with an elevation of 6,426 feet above sea level. The elevation of the entire interior portion of the unit averages between 3,000 and 4,000 feet, and in the north central portion is almost plateau-like.

The climate of the hydrographic unit is characterized by moderate temperatures and high precipitation. Crescent City is representative of the populated portion of the unit along the coast and has a mean annual rainfall of almost 75 inches. The driest month here, August, averages 0.37 inches of precipitation, and the four winter months each average in excess of 10 inches. The entire coastline receives between 60 and 80 inches of rainfall annually, and precipitation increases rapidly as one moves inland. The precipitation in the interior exceeds 100 inches per year, primarily rainfall, and two areas--High Plateau and Ship Mountains--receive over 125 inches per year. The temperatures along the coast are quite uniform throughout the year. The average monthly maximum temperature at Crescent City varies from an average high of 51.7°F. in January to an average high of 66.2°F. in September. The latter is about 6°F. higher than occurs at some coastal stations, such as Eureka, where summer fogs are more prevalent.

The permanent population of the unit has remained low. Only 17,771 persons were enumerated in Del Norte County in the 1960 census. Crescent City, the only incorporated city, accounted for 2,958 residents.

Coastal Recreation

The coastal plain extends the entire length of the hydrographic area. Much of the adjacent ocean shoreline is readily accessible and is

utilized for activities such as surf fishing, ocean fishing, and clam digging. Petrified wood and other fossilized material, driftwood, stones and minerals are cast upon the shore by the ocean waves. Pebble Beach at Crescent City is noted for its agates.

The climate and scenic ocean views have resulted in the building of many ocean view homes as well as motels that offer accommodations plus direct ocean beach and surf access.

Crescent City's well protected harbor provides opportunities for pier fishing. Deep sea sports fishing boats make two trips daily, or are available for charter. The Crescent City Harbor and adjacent area provide excellent fishing for salmon, sea trout, ling cod, red snappers, black snappers, northern halibut, cabezone, china cod, groupers, flounders, big red-tailed perch, small smelt, and jack smelt.

Swimming is not a significant recreational activity in the coastal area. However, the city of Crescent City plans to include a swimming pool in a proposed Crescent City harbor recreation development. Such a development should round out the recreation activities available in the Crescent City area.

The shortage of safe swimming opportunities near the coast resulted in the Del Norte County Recreation Department's 1963 learn-to-swim program being held at Gasquet, 40 miles inland. The Recreation Department provided bus transportation between Crescent City and Gasquet, enabling children from the coastal area to participate in the program.

Smith River Delta

The Smith River Delta offers a replica of the Klamath estuary on a reduced scale. Like the Klamath, salmon and steelhead provide the principal resource, and catering to fishermen is an important segment of the local

economy. The Smith River carries a substantial flow all year around and is noted for the clarity of the water. Unlike the Klamath, following a winter storm, the Smith returns to its clear condition within a few days. Many fisherman remain in the Klamath area until the winter storms turn the river turbid and then move on north to the Smith River. Fishermen report that catches occur less frequently at the Smith River than at the Klamath, but that the average size of the individual fish is usually larger.

Several private businesses centered around the town of Smith River supply accommodations for sportsmen, provide boat docking or launching facilities, rent boats, or provide related fishing services. The County of Del Norte also provides a boat launching ramp at Smith River. During the peak of the anadromous fish runs, the line of fishing boats across the mouth of the river offers a picture that might be mistaken for the Klamath.

The Redwood Forest

Although the northern limit of the natural range of the coast redwood is only a few miles north of the Smith River in Oregon, some of the most magnificent existing groves of redwood are found in this hydrographic area. These groves are being preserved in Del Norte Coast Redwoods State Park and in Jedediah Smith Redwoods State Park on the Smith River. Both parks are traversed by major highways. U. S. Highway Route 199, the inland route from Grants Pass, Oregon to northwestern California passes through Jedediah Smith Redwoods and joins U. S. Highway Route 101 just 4 miles northeast of Crescent City. Highway 101 passes through Del Norte Coast Redwoods about 10 miles south of Crescent City.

Del Norte Coast Redwoods State Park is undeveloped from the standpoint of physical items such as campgrounds or picnic sites. Its



SMITH RIVER SWIMMING BEACH
Jedediah Smith Redwoods State Park



FAMILY CAMPING IN THE REDWOODS

6,000 acres includes about 5 miles of ocean frontage accessible by trails leading from turnoffs on the main highway.

Jedediah Smith Redwoods State Park is the first major redwood area encountered by tourists entering coastal California from Oregon. The 9,500 acre park offers many activities along with the enjoyment of the redwood groves. Smith River, a fresh, clear stream with all year fishing, flows through the park. The river also offers safe and pleasant swimming with sand bars, a mile-long beach, and several deep swimming areas. One of the groves included in the park, Stout Grove, is said to be the heaviest stand of timber in the world, 19 million board feet in 100 acres. Attendance is summarized in Table 37.

Visitor estimates at Jedediah Smith Redwoods State Park have shown an irregular although generally increasing trend over the last decade. Attendance trends at this park are indicative of recreation use and travel in the Smith River Hydrographic Unit. Increase in attendance at the park for the period 1950-62 has paralleled the increase in entrances at the State Border Quarantine Station on U. S. 199 northeast of the park.

During the period 1950-62 capital improvements at the park have increased the number of campsites from 57 to 102.

The Del Norte Chamber of Commerce recently proposed that a recreation reservoir be constructed on the Smith River above Jedediah Smith Redwoods State Park. The proposal calls for a low level summer dam spanning the Smith River at the Society Hole about a third of a mile from Hiouchi Bridge on U. S. 199. The dam would create a swimming and water skiing area for boating enthusiasts and was proposed as a means of stopping tourists in Del Norte County.

TABLE 37

ATTENDANCE AT JEDEDIAH SMITH REDWOODS STATE PARK
AND AT CALIFORNIA STATE PARKS 1/
(1950-1962)

Years	: Jedediah Smith Red-	: California	: % Jedediah Smith
	: woods State Park	: State Parks	: to Total
	: No. Visitors : Index	: No. Visitors : Index	: in State
1950	88,814 100	3,787,955 100	2.3
1951	107,033 121	4,255,505 112	2.5
1952	133,316 128	4,596,712 121	2.5
1953	123,927 140	5,431,467 143	2.3
1954	113,605 128	5,837,737 154	1.9
1955	127,585 144	6,470,654 171	2.0
1956	105,118 118	6,782,723 179	1.6
1957	182,000 205	8,729,510 230	2.1
1958	101,721 115	11,203,355 296	.9
1959	122,753 138	12,652,675 334	1.0
1960	133,377 150	14,171,484 374	.9
1961	149,385 168	16,483,418 435	.9
1962	157,372 177	17,325,106 457	.9
1963	173,938 196		

Inland Areas

The interior of the Smith River Hydrographic Unit is bisected by U. S. Highway 199, the main route from Crescent City to Grants Pass, Oregon. The recent completion of the Randolph Collier Tunnel, about 2 miles south of the California-Oregon border at Hazelview Summit, eliminated a narrow winding mountain pass and should result in increased travel over this route and possibly increased recreation use along the Smith River. The highway parallels the middle fork of the Smith River over much of its length.

Private lodges and U. S. Forest Service campgrounds are available to the highway traveler. The Forest Service administered land is included in the Gasquet Ranger District. According to the Forest Service publication "Public Campgrounds California Region 1962," the Gasquet Ranger District of

the Six Rivers National Forest maintains 72 campsites. Many recreation use sites are being enlarged and modernized through the Accelerated Public Works Program.

The Gasquet Ranger District estimated visitor recreation use during 1962 at 40,125 visitor-days. The estimate results from more refined sampling of visitors in the area and should not be compared with previous annual estimates. Forest Service personnel believe that the number of visitors to the Gasquet District is generally increasing from year to year.

Proposed State Water Projects

None of the projects proposed for development by the State are located in the Smith River Hydrographic Unit.

NOTES: CHAPTER XV

1. Visitor-Day Estimates from California Division of Beaches and Parks Records.

CHAPTER XVI. TRENDS IN RECREATIONAL ACTIVITY

The investigation of recreation in the North Coastal area reveals several general over-all trends or situations. Although not all of these have been documented by data from individual areas, they appear significant and are discussed in this chapter.

Growth of Public Recreation Areas and Attendance

Prior to 1900, practically all recreation activity in the North Coastal area depended upon and resulted from privately furnished facilities. Among the exceptions would be city parks, such as the one at San Rafael, where the San Rafael Days "near-riot" took place in 1860, and public water supply reservoir watershed land in Marin County. Large numbers of people visited North Coast and other nearby recreation areas while visiting and utilizing private facilities. Considering the extent of facilities that had apparently been needed at locations such as the Russian River resort area, Calistoga, Cobb Mountain area, Clear Lake, and other less extensively used locations, it does not appear that recreational activity has increased at a much greater rate than population. The one location where attendance data are available for a 50-year period, Muir Woods National Monument, indicates that growth of attendance at that location has paralleled population growth without significant additional visitation attributable to new bridges, better roads, 5-day weeks, or increased disposable income.

Attendance at public recreation facilities has grown during this century from practically nil (and no facilities) to its present high level. Obviously, during this period attendance records have skyrocketed. Such

records may not reflect the actual increases in rates of public participation in outdoor recreational activities. Rather they probably indicate an increasing dependence on available public recreation sites. Private homesites and resorts must frequently be located near public parks or similar areas to gain access to recreation resources such as ocean, lake, and stream frontage. This dependence on public use areas should increase in future years.

During the course of this study only a few sets of attendance estimates have been found that provide visitor-day estimates over a period of many years. Some of these have been compiled and included in this report to illustrate the growth in recreational use that has occurred in recent years. One result of such tabulations was the discovery that many individual locations have actually experienced a decline in recreational use over the last few years. In some locations the decline has been of short duration. These use figures do not necessarily indicate that recreational activity has reached a peak or that future years will not experience continued growth. The downturns at Stinson State Beach and Lake Mendocino apparently result from heavy publicity before the facility development could accommodate the large numbers of people attracted by such publicity. The downturn at Shasta-Trinity National Forest may be attributed principally to a series of seasons with low rainfall. This reduced the water elevation at Shasta Lake and depressed the recreational use of that body of water. The low precipitation also reduced use of the snow sports area on the Shasta-Trinity National Forest.

TABLE 38

UNITS OR AREAS WITH STABILIZED RECREATION ATTENDANCE

Unit or Area	: Peak estimated		: Latest available	
	: attendance		: attendance	
	: Year	: Visitor-days	: Year	: Visitor-days
Mt. Tamalpais State Park	1958	398,994	1963	289,389
Stinson State Beach	1957	589,144	1963	356,050
Tomaes Bay State Park	1958	104,578	1963	64,069
Samuel P. Taylor State Park	1962	193,824	1963	160,844
Lake Mendocino	1960	451,000	1962	90,000
Shasta-Trinity National Forest	1959	1,540,000	1962	1,290,000
Patrick's Point State Park	1959	152,260	1962-3	113,858
Prairie Creek Redwood State Park	1961	257,327	1962-3	236,580
J. Smith Redwood State Park	1957	182,000	1963	173,000

Visitor estimates covering a period of from 5 to 10 years are included in the chapters concerning the hydrographic units in which the above units or areas are located.

Out-of-State Visitors

Very little information was found to be available concerning out-of-state tourists and their use of recreational facilities. The "California Public Outdoor Plan" listed the total number of persons entering California for pleasure trips for the years 1930 through 1958, but otherwise appears to have considered only activities by California residents. Information from the State Border Plant Quarantine Stations indicates that exceptionally large numbers of tourists passed through the North Coastal area stations

during 1962 (the year of the Seattle World's Fair) and that a larger than normal percentage were residents of California. During previous years, the majority of entrances at these stations had been out-of-state residents.

TABLE 39

TRAFFIC ENTERING CALIFORNIA
REDWOOD HIGHWAY AND SMITH RIVER
STATE BORDER STATIONS (1958-1962)

Year	Passengers			Percent of non-Californians
	Californians	Non-Californians		
1962	810,825	752,092		48.1
1961	309,741	482,338		60.9
1960	284,400	452,155		61.4
1959	272,542	367,275		57.4
1958	248,548	408,617		62.2

The out-of-state residents who visit the North Coastal area exert a significant influence on the economy and recreational facilities. Several characteristics of this group may be inferred from the available information.

1. Most out-of-state visitors utilize the Redwood Highway. They are attracted by the scenic resources (the Redwoods and Pacific Ocean seashore), but during the course of their trip may visit other historic, cultural, and scenic attractions.

2. The Pacific Ocean seashore between Marin County and southern Humboldt County constitutes a secondary major attraction for out-of-state residents.

3. Few out-of-state residents engage in sporting pursuits such as fishing and hunting. They infrequently visit specific fishing and hunting areas. The vast majority of visits occur during the summer months rather

than during the opening of fishing or hunting seasons or during salmon and steelhead runs.

4. Probably most out-of-state tourists utilize first class accommodations (restaurants, motels, and hotels) in major cities such as Eureka, Santa Rosa, and San Francisco.

5. Out-of-state visitors utilize facilities along their route of travel but generally do not enter back-country areas.

The following samples of out-of-state attendance in the North Coastal area have been compiled either during this investigation or during earlier investigations.

TABLE 40

NON-CALIFORNIA RESIDENTS IN THE NORTH COAST

Location of attraction	:Year	: Percent of : :non-Californians :	Type of attraction
<u>Redwood Highway</u>			
Richardson Grove State Park U.S. 101-Redwood Highway	1956	03.1 ^{1/}	Day use recreation in Redwood-River Area
Richardson Grove State Park U.S. 101 Redwood Highway	1956	10.1 ^{1/}	Camping in Redwood-River Area
Jedediah Smith State Park U.S. 199 Redwood Highway	1956	33.1 ^{1/}	Day Use Recreation in Redwood-River Area
Jedediah Smith State Park U.S. 199 Redwood Highway	1956	25.9 ^{1/}	Camping in Redwood-River Area
Italian Swiss Colony Winery, Asti, California U.S. 101-Redwood Highway	1962	51.4	Tourist Attraction featuring wine industry
One-Log-House Leggett, California U.S. 101-Redwood Highway	1962	54.8	Tourist Attraction featuring Coast Redwood

TABLE 40 (continued)
NON-CALIFORNIA RESIDENTS IN THE NORTH COAST

Location of attraction	: Year :	Percent of : : non-Californians:	Type of attraction
Klamath Estuary Requa, California U.S. 101-Redwood Highway	1962	06.4	Boat Rentals for Salmon and Steelhead Fishing
<u>Pacific Ocean</u>			
Van Damme State Park Little River, California California Highway 1	1960	09.0	Camping in Coastal Canyon adjacent to Pacific Ocean
Shelter Cove Thorn, Humboldt County End of County Road	1962	01.3	Camping adjacent to Pacific Ocean. Fishing Opportunities
Doran Park Bodega Bay, California California Highway 1	1960	00.25	Boat Launching by Salmon and other Pacific Ocean Fishermen
Fort Ross State Histori- cal Monument Sonoma County California Highway 1	1962	18.7	Early History of Russian Settlement in California
<u>Interior</u>			
Lake Pillsbury Lake County Unpaved Roads	1961	00.4	Forest and Lake with Camping, Resorts, Boating and Fishing
Ruth Lake Trinity County State Highway 36	1963	02.2	Forest and Lake with Camping, Resorts, Boating and Fishing
Oak Bottom Camp Somesbar, Trinity County State Highway 96	1962	02.2	Camping while Salmon or Steelhead Fishing on Salmon River
Trinity Lake District Trinity National Forest County Roads	1956	01.8	Camping, Fishing, etc. adjacent to Upper Trinity River
Trinity County County Wide	1962	00.25	Successful Deer Hunters
Deerlick Springs Trinity National Forest Unpaved Forest Road	1961-2	04.0	Camping, Fishing, Resort, Hot Mineral Baths
The Petrified Forest East of U.S. 101 on paved roads	1962	31.0	Geologic Exhibit

TABLE 40 (continued)
NON-CALIFORNIA RESIDENTS IN THE NORTH COAST

Location of attraction	: Year :	Percent of : non-Californians :	Type of attraction
The Geysers East of U.S. 101 over narrow paved road	1962	10.0	Geologic Exhibit
Jack London State His- torical Monument East of U.S. 101 paved roads	1962	12.3	Historical and Literary Exhibit
Weaverville Joss House State Historical Monument U.S. 299	1962	09.5	Historical Exhibit

The above estimates of out-of-state visitors do not result from uniform sampling methods. They should be considered as rough indicators of the appeal of the particular attractions to the out-of-state resident visiting the North Coastal area.

Tourist Activity

Tourists are not precisely defined in this report. In general, they are considered to include vacationers traveling many miles, visiting many attractions, and not devoting the majority of their time to a single attraction. California residents engaged in tourist activities seem to conform to the travel patterns found among out-of-state residents.

Tourist activity is particularly noticeable along the Redwood Highway. At the Redwood State Parks along this route a significant portion of the visitors are sightseeing tourists. Studies have indicated that campers in the Redwood State Parks, Richardson Grove, Standish-Hickey, and Stephens Grove and Burlington Units of Humboldt Redwoods do not include a large percentage of anglers. During 1959,

only 6.4 percent of the campers at these Redwood Parks adjacent to the South Fork of the Eel River fished during their camping stay.^{2/} Most of the camping at the above parks takes place during the summer months when fishing is not particularly good, that is, in the period after the spring trout season and preceeding the fall and winter anadromous fish runs.

The State Parks in the North Coastal area, having been selected as State Parks because of their particular characteristics, attract large numbers of tourists. According to James P. Tryner, "In the Redwood Coast Parks in 1961, approximately 20 percent of the visitors came for formal uses such as camping, swimming, and picnicking while 80 percent came just to look."^{3/} Even among those who camped, swam, fished, and picnicked, a large proportion of the visitors evidently are tourists.

During the year, 1962, the average length of stay of campers at Richardson Grove State Park was 2.4 days. Over one-half of the campers remained only one night and then proceeded on their way. Most parks along major travel routes experience similar use patterns. The visitation at these parks is very heavy during the summer months with a peak in use during July or August. Campsites at the parks adjacent to U. S. 101 are inadequate to meet the needs during these months. Most parks could probably double their campgrounds without having more sites than would be needed during the summer months. If it were decided that it is proper and necessary for public camping facilities to be provided to satisfy the summer need, the problem would be how many facilities should be located along a popular tourist travel route in order to accommodate the tourists who choose the particular route because of the outstanding attractions such as redwood groves or

ocean frontage. It does not appear that dams, reservoirs, or civil works projects other than better highways will attract significant numbers of additional tourists to the North Coastal area. However, facilities such as campsites, will be utilized whenever they are conveniently located in relation to popular travel routes.

Annual Distribution of Recreational Use

The preceding paragraphs pointed out that, along the Redwood Highway and the coastal route served by State Route No. 1., recreation use is heavily concentrated in the summer vacation months, and that recreational facilities are heavily taxed during these months. This use pattern is especially unfortunate along the Pacific Ocean seashore. Summer months include a high proportion of days that are either foggy or windy and that are generally unpleasant. In contrast, the spring and fall months include many beautiful clear sunny days. Perhaps in future years more of our people will be free to enjoy the seashore area during the more attractive seasons of the year.

An exceptionally large proportion of the recreational land in the North Coastal area has a seasonal use pattern that does not conform to that found at most coastal seashore and redwood forest developments. These areas attract visitors primarily during fishing and hunting season, but visits by summer vacationers involves too great a travel effort for most prospective visitors. The attractions generally are spring trout fishing, fall or winter run salmon and steelhead fishing, or fall deer hunting.

The Klamath River estuary receives heavy use during late summer and during the fall. June and early July are among the months receiving light use.

The Bear Creek Area of the Upper Lake District of Mendocino National Forest receives heavy use in May, moderate use in summer, and its heaviest use following the opening of deer season. Probably some other sections of the Mendocino National Forest experience similar use patterns.

The Mad River Ranger District of the Six Rivers National Forest also experiences a bimodal annual use pattern with ample camping facilities available at Ruth Lake during the summer months.

The Yolla Bolla District of the Trinity National Forest reported a visitation pattern similar to that of the Mad River District. Only the Deerlick Springs campground receives full occupancy during the summer months.

The Klamath River system is heavily used during fall and winter salmon and steelhead runs. During the summer months many campgrounds are practically unoccupied.

Extensive land areas in the interior portions of the national forests are capable of accommodating significant increases in recreational use. These lands are reached only after lengthy travel from population centers, often over unsurfaced forest roads. The low level of recreational use is reflected in the slow acceptance of U. S. Forest Service summer home sites. Some tracts have sites available for prospective cabin owners while other tracts were developed or are being developed very slowly. Such interior lands possess sufficient elevation to provide relief from summer heat found in the adjacent lowlands. The lands, also, generally are at elevations that support attractive coniferous forest growth.

The continued improvement of roads into the interior of North Coastal area (such as the improvements the Federal Government

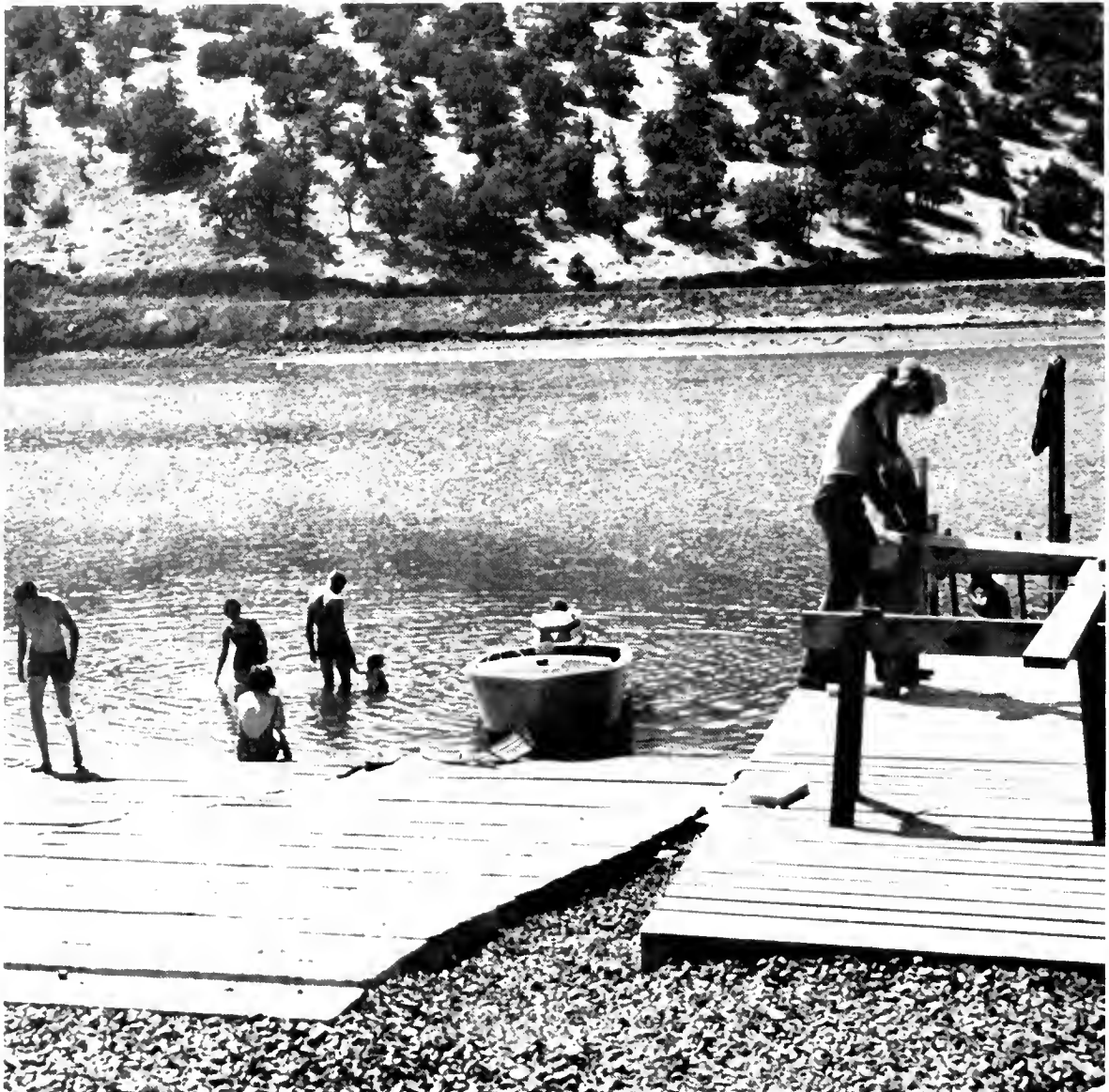
is making to the eastern portion of the Peanut Road) should eventually bring about much greater recreational use of the interior forest lands.

The development of reservoirs in or near the interior of the North Coastal area should accelerate the growth of the recreational use on nearby lands. Although large numbers of tourists could not be expected to visit as a result of such developments, the residents of valley and coastal cities and the growing San Francisco Bay Metropolitan Area should find new vacation opportunities in the nearby mountains.

Maintenance and enhancement of the fisheries in the coastal area and redwood belt, particularly the South Fork of the Eel River, should result in longer recreation seasons permitting commercial and public developments to spread their use over a greater number of months. The commercial recreational developments suffer at present from the short summer tourist season and lack of the winter trade familiar to snow sports areas.

NOTES: CHAPTER XVI

1. Decker, Kenneth, "Natural Resources of Northwestern California, Preliminary Report. Appendix, Recreation Resources Supplement: Economic Aspects Prepared by the National Park Service for the U. S. Department of the Interior, Pacific Southwest Field Committee, June, 1957
2. McCormick, Ralph. Department of Fish and Game Field Investigation, unpublished, 1959
3. Tryner, James P., A presentation included in "Tourist Recreation in California's Northwest Counties." A group of presentations made before the State Recreation Commission at the Regular Meeting of August 25, 1961, at Eureka, California, Duplicated, State Division of Recreation, 1962



IRON GATE RESERVOIR

Klamath River

"In California, recreation is characteristically water-centered; 60 percent of all recreation tallied in this study (except travel) was water-oriented. No water body in the State -- no reservoir, no stream, no lake, was too remote to be used."

California Public Outdoor Recreation Plan.

CHAPTER XVII. METHOD OF ESTIMATING RESERVOIR RECREATION ATTENDANCE

"In California, recreation is characteristically water-centered: 60 percent of all recreation tallied in this study (except travel) was water-oriented. No water body in the state-no reservoir, no stream, no lake, was too remote to be used."

The above quotation from the California Public Outdoor Recreation Plan also applies to the future and to reservoirs that might be constructed in the North Coastal area. The question is not whether the reservoirs will be used for recreation but how many of us will turn to these new resources. In California, at the present time, fluctuating reservoirs provide a significant proportion of the recreational opportunities utilized by the people of California. In future years this dependence on artificial water empoundments is expected to increase in relative importance.

Reservoir Recreation Units of the State Park System

Of the 104 units of the State Park System where the attendance is estimated and reported, four units are located adjacent to artificial lakes. The four units, Benbow Lake, Folsom Lake, Millerton Lake, and Turlock Lake, accommodate 3,197,241 visitor-days of recreation use during the fiscal year 1961-62 while the other 100 state park units accommodated 24,610,481 visitor-days of recreation use during the same period.^{1/} Thus the four reservoir associated park units accounted for 11.4 percent of the gross reported recreation use in the State Park System.

U. S. Army Corps of Engineers Reservoirs

The State Division of Beaches and Parks is only one of many organizations in California that administers public recreation areas on

fluctuating reservoirs. U. S. Army Corps of Engineers reported 1961 attendance at ten reservoirs at 4,304,700 visitor-days.^{2/}

U. S. Bureau of Reclamation Reservoirs

The U. S. Bureau of Reclamation has constructed 19 reservoirs in California that attract numbers of recreation users. Three of the reservoirs are included in the State Park System, Folsom and Natomas Reservoirs in Folsom Lake State Recreation Area and Millerton Reservoir in Millerton Lake State Recreation Area. The recreation activities at the 16 other reservoirs accounted for 3,830,910 visitor-days^{3/} during the year 1962. The total of over 11 million visitor-days at these 30 reported reservoirs is approximately 5 percent of the total estimated outdoor recreation use in activity days for the entire state as reported in California Public Outdoor Recreation Plan, Part II.

Other Reservoirs Supporting Recreational Activities

The list of 30 reservoirs with recreation activities that are reported by either the State Park System, the Bureau of Reclamation or the Corps of Engineers includes many of the State's largest reservoirs and a few of the smaller; however, the 30 listed are only a small proportion of the total number of reservoirs receiving recreation use. Other organizations such as the City of San Diego, City of Los Angeles, City of Napa, Stanford University, Southern California Edison Company, Pacific Gas and Electric Company, East Bay Regional Park District, Vista Irrigation District, Monterey County Flood Control and Water Conservation District, Merced Irrigation District, Santa Clara Valley Water Conservation District, Marin Municipal Water District, and Humboldt Bay Municipal Utility District maintain reservoirs that are heavily used for recreational purposes.

The total number of reservoirs in California that receive some recreational use has not been compiled, nor has the total recreational use accommodated by reservoirs been estimated. Nevertheless, it is apparent that artificially created water impoundments are able to satisfy a significant proportion of the recreation needs of California's citizens.

Reservoir Recreation Compared to Other Available Recreation

Often reservoirs are found to attract and accommodate a significantly higher level of recreational development and use than nearby forest or streamside land. Two previously cited examples are Lake Pillsbury where the recreational use in 1961 that was associated with the 2,280-surface acre reservoir was equivalent to 36 percent of the total recreational use on the 866,722-acre Mendocino National Forest. Another reservoir, 29,000-surface acre Shasta Lake, accounted for 49 percent of the recreational visits in 1960 to the 2,334,383-acre Shasta-Trinity National Forest.

The reservoirs that are now under construction or that will be constructed in the future may also be expected to receive heavy recreational use. There are several basic environmental resources that tend to support recreational use. Artificial water impoundments, one of the environmental resources, has increased in magnitude in recent years and will probably increase in magnitude in future years. Resources such as ocean frontage and beaches, flowing rivers, streams, natural lakes, forested lands, wilderness areas and examples of outstanding scenery will in most instances either remain at their present magnitude or in some cases

may be reduced. As the population of California continues to increase, more and more people will be seeking suitable sites for recreational activities. These activities will result in even heavier use of today's resources and the use of newly developed resources, principally reservoirs.

Attendance at Reservoirs by Out-of-State Residents

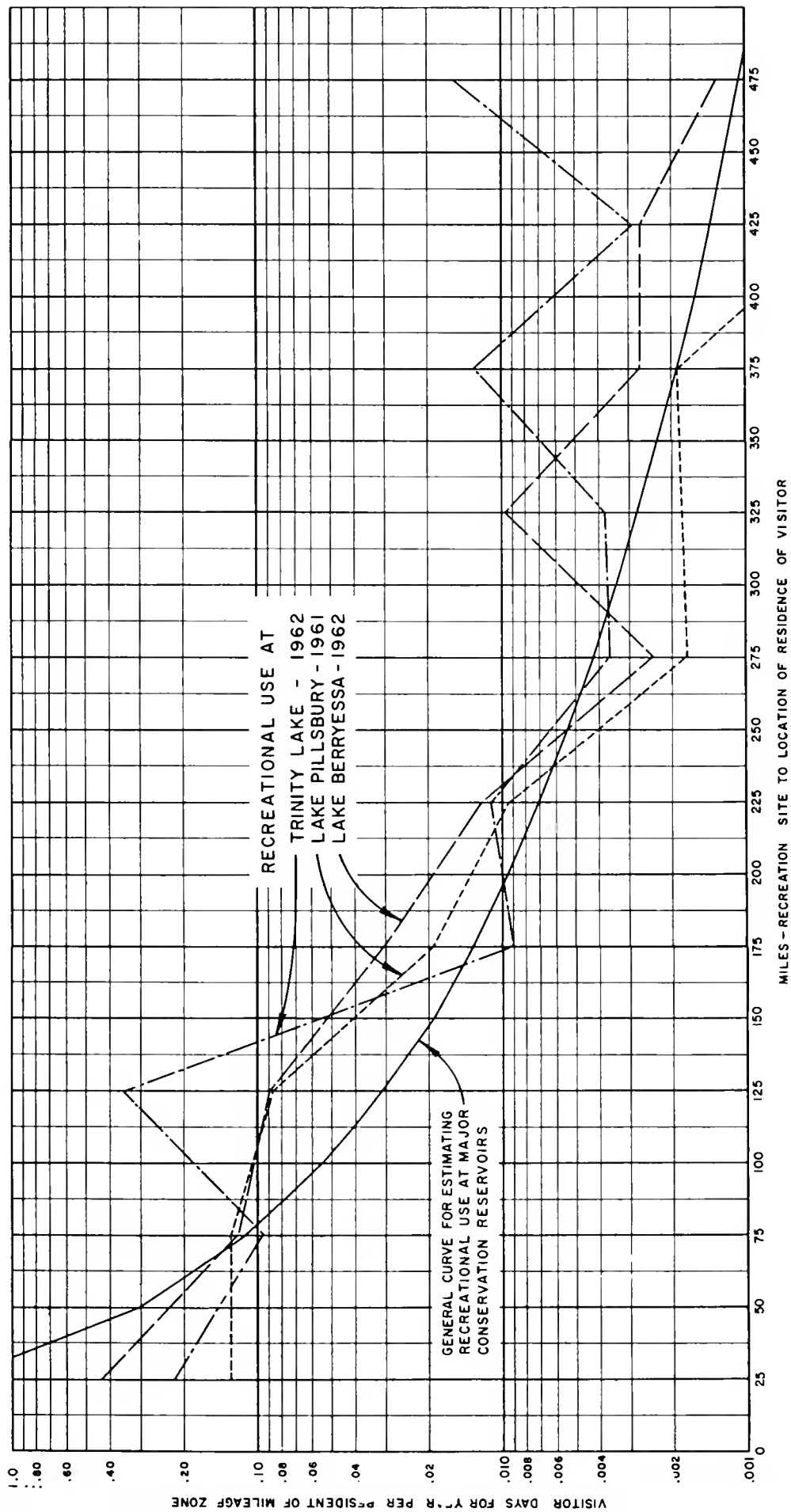
Experience at existing reservoirs indicates that the visitors to reservoirs proposed as a result of the North Coastal Area Investigation will be almost entirely residents of California. Out-of-state residents contribute a very small percentage of the visitors to existing similar reservoirs.

TABLE 41

RESERVOIR RECREATION BY NON-RESIDENTS OF CALIFORNIA

Study by	:	Location	:	Year:	Out-of-state residents
Mendocino National Forest	:	Lake Pillsbury	:	1960	8 cars out of 2,380
Department of Water Resources	:	Lake Pillsbury	:	1961	2 cars out of 348
Department of Water Resources	:	Lake Berryessa	:	1962	8 cars out of 855
Shasta County	:	Shasta Lake	:	1958	6.9% of sample
Shasta-Trinity National Forest	:	Shasta Lake	:	1958	2.1% of sample
Department of Water Resources	:	Ruth Lake	:	1963	None out of 26 cars
Department of Water Resources	:	Dwinnell Reservoir	:	1958	5 groups out of 313
Department of Water Resources	:	Bass Lake	:	1961	23 groups out of 1,726
Department of Water Resources	:	Lake Yosemite	:	1962	11 people out of 902

Of the above studies, only Shasta Lake included a significant number of out-of-state residents. Their numbers probably result from the ready access to Shasta Lake from U. S. Highway 99. This permits passing tourists and enroute campers to conveniently visit reservoir developments. Reservoirs not adjacent to major highways received such



RELATION BETWEEN POPULATION OF TRAVEL DISTANCE ZONES AND RECREATIONAL USE

limited use by non-residents of California that failure to include non-residents in visitor use estimates would not introduce a large error in the over-all estimate. Therefore, only the benefits to California residents are estimated for the reservoirs considered in the North Coastal Area Report. Only one of the reservoirs (Bell Springs) will be adjacent to travel routes that are now heavily used by out-of-state residents.

Population of Mileage Zones in Relation to Reservoir Recreation Attendance

No statistically defensible method for predicting recreation use has yet been devised. The previous chapters have summarized recreation use of many North Coast attractions in terms of population and mileage from place of residence. Figure Number 2 presents graphically three examples of available recreation use information pertaining to fluctuating reservoirs. The graph for Lake Pillsbury depicts information presented in a previous chapter. The Lake Berryessa graph combines the total Lake Berryessa recreation use for the year 1962 as reported by the Bureau of Reclamation with Lake Berryessa user-origin information for the year 1962, resulting from Department of Water Resources surveys. The Trinity Lake graph represents 79,600 visitor-days^{3/}, the Bureau of Reclamation estimate of total visitation at Trinity Reservoir for the year 1962. The 79,600 visitor-days have been distributed to the travel distance zones in the same proportion as found among campers at Tannery Gulch campground during 1962. Such a treatment tends to under-emphasize the visitation by local residents and, conservely, show a higher than actual visitation by non-local residents.

General Curve Used to Estimate Attendance at North Coast Projects

The graphs pertaining to fluctuating reservoirs - Trinity Lake, Lake Pillsbury, and Lake Berryessa - may be compared with the

geometrically declining curve that is used to evaluate the relationship between North Coastal reservoir sites and the statewide population distribution. The points on the curve are listed below.

TABLE 42
POINTS ON CURVE FOR CONSIDERING RESERVOIR SITE
AND 1960 POPULATION DISTRIBUTION

Mileage zone	:	Per capita use
0-50		1.7
50-100		.11
100-150		.031
150-200		.013
200-250		.0070
250-300		.0042
300-350		.0028
350-400		.0019
400-450		.0014
450-500		.0010
over 500		.0006

The above-defined curve was selected after study of material presented in this report as well as material that had been gathered in the course of other recreation investigations.

Variables that Reduce Per-Capita-Use from Successive Mileage Zones

The decline in use by residents of successively more distant zones may result from many influences. Some of these are listed or discussed in the following paragraphs.

1. Travel Time -- Most leisure periods are of limited duration. Obviously, the greater the travel time utilized to reach a destination, the shorter the remaining available time and also the less probable is the chance of the trip being made.

2. Travel Effort -- Travel effort also increases with distance. Driver fatigue, eyestrain, and difficulty in controlling children are items that often limit travel distance.

3. Travel Expense -- Travel expense may not be the dominant element that limits travel distances and frequency of travel. However, the expense involved also reduces the frequency of pleasure trips as distance from place of residence increases.

4. Cost-of-Living away from Home -- Food and lodging away from home usually involves costs above those encountered at the permanent residence. Some modes of living away from home such as the use of house trailers or camping and picnicking facilities tend to circumvent the additional costs. **Some of the costs at home continue while on a trip.**

5. Competition from other recreation attractions -- The San Francisco resident considering a trip to Lake Pillsbury may, by traveling the same distance, visit Van Damme Beach State Park, Calaveras Big Trees State Park, Pinnacles National Monument, or the Big Sur Coast of Monterey County. He may also travel a shorter distance and visit areas such as Clear Lake, Lake Berryessa, Russian River, Turlock Lake, the Santa Cruz Mountains, or the Monterey-Carmel area. A 50 percent increase in travel distance would allow the San Francisco resident to reach the South Fork of the Eel, Lake Almanor, Reno, Lake Tahoe, Yosemite National Park, Huntington, Shaver, and Millerton Lakes, or Hearst-San Simeon State Historical Monument. The increase in number of choices of recreation attractions and possible recreational activities with increasing distances from place-of-residence tends to reduce the frequency of visitation to an individual site as travel distance increases.

Application of Per-Capita-Use and Mileage Zones to North Coastal
Area Reservoir Sites

When the per capita use zone rates are used to compare the relationship between the distribution of the 1960 population of California and the reservoir sites considered for development in the North Coastal area, the following ratings result.

TABLE 43

NORTH COAST RESERVOIR LOCATION
IN RELATION TO 1960 POPULATION

Reservoir site	:	1960 location population rating, in visitor-days
Knights Valley		796,000
English Ridge		239,000
Dos Rios		101,000
Spencer		76,000
Bell Springs		175,000
Sequoia		200,000
Ruth		44,000
Eaton Valley		67,000
Butler Valley		176,000
Helena		65,000
Eltapom		42,000
Burnt Ranch		66,000
Humboldt		171,000
Westside Conveyance System		287,000
Glenn Complex		400,000

The above table provides location ratings in terms of visitor-days annual attendance at a major conservation reservoir. The ratings are an expression of the relationship of the reservoir site to the manner in which the population of California is distributed. Characteristics of a major conservation reservoir that might attract such use include the following:

1. The land adjacent to the reservoir will be able to accommodate recreation developments and such will have been constructed.

2. Public roads will have been extended to the developments.,

3. An agency such as the U. S. Forest Service or the California Division of Beaches and Parks will have developed, operated, and maintained recreation facilities over a period of several years.

4. During years of above normal rainfall the reservoir will have been nearly full during most of the summer and will have experienced a high level of recreational use with overcrowded facilities.

During years of normal rainfall the reservoir will have presented favorable conditions for recreational uses during the spring and early summer months. Late season drawdown usually will depress attendance during late summer and fall months.

During dry years or a series of dry years the reservoir will have experienced reduced annual recreational attendance. The need to utilize the planned project yield in other areas also experiencing below normal rainfall as well as the need to maintain downstream releases will result in the outflow exceeding the inflow to the reservoir over a considerable period of time. During such years heavy winter inflow will not quite replace the high annual outflow and successively lower water surface elevations will be attained as the dry period lengthens. The result of such a dry period on recreational attendance is reflected in Shasta Lake data covering the period 1958-1961. While recreational use decreases the result is not disastrous. Although fluctuation at reservoirs tends to generally depress recreational use, the year in--year out attendance records result from their providing many people a means of satisfying their particular recreational needs.

Projection of Population-Distance Relationship

The population-distance relationship considers a location at a specific time -- 1960. If another year, or period of time is considered, the relationship would need to be modified accordingly. Forecasts of

future population and estimates of increases in per capita participation in leisure activities enter the computation of the population-distance rating for a year other than 1960, say 1990, in the following manner.

$$\text{Rating (1990)} = \text{Rating 1960} \times \frac{\text{Population Factor (1990)}}{\text{Population Factor (1960)}} \times \frac{\text{per capita use factor 1990}}{\text{per capita use factor 1960}}$$

The population factor used in this reconnaissance is derived from the Department of Water Resources' projections for the State of California. The use of individual county projections and the consideration of a revised population distribution around each reservoir site would provide an alternative method for considering population changes. The statewide projection was used in order to simplify the calculation of visitor-day estimates at the reconnaissance level. Most visitor-day estimates will be lower than would result if each county population projection and distance factor were computed. The following table summarizes the derivation of population projection factors.

TABLE 44

STATE POPULATION FACTORS (1960-2050)

Year :	Population :	Ratio to 1960
:	projection :	population
1960	15,830,000	1.0
1970	21,700,000	1.37
1980	28,200,000	1.78
1990	35,000,000	2.21
2000	42,000,000	2.65
2010	49,000,000	3.10
2020	56,000,000	3.54
2030	63,000,000	3.98
2040	70,000,000	4.42
2050	77,000,000	4.86

Applying Changes in Leisure Time, Disposable Income, and Methods of
Transportation to Future Recreation Attendance Estimates

The second element entering North Coastal area reservoir recreation use projections results from evidence of an increasing rate of participation in leisure time activities. The California Public Outdoor Recreation Plan refers to this as the "TIM" factor. The title is derived from "time-income-mobility." The use of the factor in recreation projections serves to recognize increased future needs resulting from forecasts of a declining number of hours in the average work week, increased disposable take-home-pay, and improved methods of transportation that will permit the individual to travel with increasing efficiency between job, and wherever he chooses to spend his leisure time.

The evaluation of the "TIM" factor used in this reconnaissance is based on actual and estimated attendance information from the California State Parks, National Forests in California, and the National Park units located in California. The increase in attendance in the last few years is used to predict the effect of the continued increases in leisure time, disposable income, and improved transportation.

The following table lists the "per capita use factors" that have been used in attendance projections in this report.

TABLE 45

STATE PER CAPITA USE FACTORS (1960-2050)

1960	1.00
1970	1.28
1980	1.55
1990	1.83
2000	2.10
2010	2.38
2020	2.65
2030	2.93
2040	3.20
2050	3.48

The rating of a reservoir site in relation to population for any given year may be determined by multiplying the 1960 rating by the appropriate "population" and "per capita use" factors. The 1980 population-distance rating for Knights Valley would be: $796,000 \times 1.78 \times 1.55 = 2,196,000$ visitor-days.

For any given decade, the rating would be ten times the average of the rating at the beginning of the decade and the first year of the following decade. An exception to the above would occur in the first decade. The growth in recreational use during the first decade often follows an irregular pattern. Some non-recurring events tend to increase attendance at newly created water impoundments. One of the more frequently encountered events results from the initial high fertility of the inundated land. Fishing is usually especially good during the first few years of a reservoir's existence. Following the initial bloom, success normally declines as the nutrients are depleted. Fluctuation destroys the vegetation in the littoral zone and often interferes with fish reproduction, two developments that further reduce the likelihood of successful fishing.

Some reservoirs have experienced a drastic reduction in attendance after the first few years of operation. Resort facilities, summer homes, lakeside subdivision, roads, and other developments that attract a returning clientele are usually lacking during most of the first decade of operation. When fishing quality declines, the effect of other shortcomings on recreational attendance is increased.

The expected attendance during the first decade of operation at North Coast project reservoirs has been estimated at two-thirds the attendance that would have been predicted at an established reservoir.

While the presence or lack of a local population is of primary importance in estimating attendance at large conservation reservoirs with wide fluctuations in water surface elevations, several other factors exert an influence on attendance expectations.

Limitations Imposed by Terrain

The limited area of land adjacent to the reservoir shore that will be accessible and may be economically developed in a manner that will support and attract recreation attendance is of critical importance at many proposed North Coast reservoir sites. In this respect, the characteristics of each site should be given further consideration.

NOTES: CHAPTER XVII

1. Visitor Day estimates from California Division of Beaches and Parks records.
2. Public Recreation Use, Civil Works Projects, Corps of Engineers, Department of the Army, May, 1961
3. Recreation and Wildlife Summary, Calendar Year 1962, U. S. Bureau of Reclamation

CHAPTER XVIII. ESTIMATED RECREATIONAL POTENTIAL OF INDIVIDUAL RESERVOIRS

This chapter contains discussions of the recreation potential and estimates of the attendance for individual reservoir sites. Where sufficient information is available, the attendance detriments are also estimated and subtracted from attendance estimates to provide the net benefit in visitor-days that may be expected if the reservoir is developed. The proposed reservoirs are shown on Plate No. 1, bound in the back of this report.

Upper Eel River Reservoirs

Plans for the Upper Eel River Development call for routing the surplus flows of the Middle Fork Eel River to the Sacramento Valley either via the Glenn Reservoir Complex or via Clear Lake and Lake Berryessa. For purposes of this report, proposed reservoirs on the Middle Fork Eel River correspond to the Clear Lake routing. They are Spencer and Dos Rios. The development also includes English Ridge Reservoir on the Upper Main Eel River.

These three reservoirs are similar in many respects. They are located in interior basins of the Coast Range between the redwood forests found on the mountains near the coast and the mixed conifer forests found in the higher mountain ranges of the divide between the coastal drainage and the Sacramento Valley drainage. In many respects the reservoir sites lack the recreation assets that are found as natural conditions to the east and west.

Rainfall in the reservoir sites totals from 40 to 50 inches a year, however, the forest growth that might be expected to accompany such

a precipitation record is largely lacking. Where traces of forest growth are found, it appears that these forests once covered a more extensive area but have been reduced by logging, clearing, or burning. Only the upper end of the English Ridge site could presently be considered as forested.

Most of the land in and adjoining the Upper Eel Reservoir sites is utilized for cattle production. Outside the canyons much of the land is rolling with cover of oak, grass, and chaparral. Other trees found adjacent to the reservoir sites include Douglas fir, ponderosa pine, knob-cone pine, madrone, and cypress. Summers are hot and dry and are little affected by the cooling fogs from the Pacific Ocean that modify the climate closer to the coast and support the redwood forests with their attendant recreation significance.

At the present time the reservoir sites lack the attributes that result in prosperous recreation developments. What developments exist are handicapped by poor road access, dry summers, and warm stream conditions that eliminate most stream fishing during summer months. Present recreation accommodations include recreation cabins, summer resorts, resort and cabin developments, organization camps, and industry and forest service provided camp and picnic sites. The creation of bodies of water with surface areas of from 10 to 18 square miles should attract many people to this otherwise lightly used area just as Lake Berryessa and Lake Nacimiento do today.

Spencer Reservoir

Spencer Reservoir would be constructed on the Middle Fork Eel River near Covelo. Present plans call for an 850,000 acre-foot capacity reservoir with a normal pool elevation of 1,708 feet and a surface area

of 6,600 acres. The reservoir would be operated for water conservation and power production. Minimum pool at Spencer Reservoir would be 1,525 feet, a maximum drawdown of 183 feet.

The topography of the land adjacent to Spencer Reservoir would allow development to permit recreational use of the stored water at all reservoir elevations. However, the irregularity of the terrain would probably result in widely spaced facilities which would increase both capital and operational costs and reduce expected attendance. Some facilities could be located below the dam where they might serve visitors to both Spencer Reservoir and the upper end of Dos Rios Reservoir when that reservoir is near maximum pool.

The location of Spencer Reservoir in relation to the 1960 population of California indicates that a reservoir in that site would have attracted 76,000 visitor-days of recreational use during 1960. Because of the anticipated difficulties of providing a large scale development at Spencer Reservoir and the necessity of utilizing progressively less desirable sites for recreation use, the increases in recreational use for years following 1960 have been reduced by a factor of 50 percent. The resulting estimates of reservoir recreation attendance have been summarized in Table 46.

The suitability of land for recreation development probably restricts use by overnight users and vacationers to a greater extent than it restricts participation by day users who often are visiting a facility very close to their residence. The attendance estimates for both Dos Rios and Spencer Reservoirs reflect the sparse local populations and the opinion that the cost and convenience of overnight facilities will limit development and attendance to a greater extent than found at other projects such as English Ridge and Knights Valley.

TABLE 46

SPENCER RESERVOIR
POTENTIAL ATTENDANCE
1960-2030

Year	Potential attendance
1960	76,000
1970	104,500
1980	143,000
1990	191,500
2000	249,500
2010	318,500
2020	394,500
2030	481,000

If Spencer Reservoir is completed and in operation by 1980, the recreational development should be planned so as to accommodate the attendance estimates in Table 47.

TABLE 47

SPENCER RESERVOIR
EXPECTED ATTENDANCE
1980-2030

Year	Expected average annual attendance
1990	192,000
2000	250,000
2010	318,000
2020	394,000
2030	481,000
Decade	Expected attendance by decade
1980-1990	1,117,000
1990-2000	2,210,000
2000-2010	2,840,000
2010-2020	3,560,000
2020-2030	4,375,000

Present recreational use in the Spencer Reservoir site remains at a low level. Some hunting takes place on private lands, particularly in Williams Valley. The reservoir will cover the only extensive section of the Middle Fork of the Eel River that is accessible from public roads. This stretch, approximately 3 miles in length, is very popular during the summer season with local residents. Some fishing use also takes place during winter salmon and steelhead runs. The U. S. Forest Service maintains a campground at the Eel River Ranger Station. One private rental cabin development is located nearby. The planned extension of a trans-basin state highway through or near the Spencer Reservoir site may result in increases in future use of this area in addition to that which may be accounted for by local population growth. A 10 percent reduction in gross attendance at the reservoir would probably provide a proper adjustment to obtain a net attendance estimate.

Dos Rios Reservoir

Dos Rios Dam, located on the Middle Fork Eel River near Dos Rios, just a short distance above the confluence of the Middle Fork and the Main Stem of the Eel would create a 560,000 acre-foot capacity reservoir with a surface area of 6,500 acres at normal pool elevation of 1,325 feet. The dam would back up water in the Middle Fork of the Eel for 21 miles, nearly to the base of Spencer Dam. One arm of the reservoir would inundate the lower 4-1/2 miles of Elk Creek.

Like many of the proposed reservoirs in the North Coastal area, Dos Rios will occupy the lower elevations of a deep narrow canyon. Much of this canyon shows evidence of recent landsliding. For purposes of this

study, it was assumed that recreation developments would not be located in areas subject to landslides. This consideration would eliminate recreational developments from at least 95 percent of the shoreline of Dos Rios Reservoir. Although the remaining land is not necessarily ideal for recreational use, some recreational development is possible at this reservoir.

In contrast to the terrain around the reservoir, the actual reservoir operation will, in comparison to other considered developments, be very favorable to recreational uses. According to current plans, fluctuation will be limited to 50 feet -- the difference between maximum pool and the lowest elevation from which the Elk Creek Pumping Plant will transfer water to English Ridge Reservoir.

Because of the problems that would be associated with providing public access to Dos Rios Reservoir and the location of the reservoir in relation to existing and planned reservoirs, the recreation facilities probably should not be developed to accommodate more than 250,000 visitor-days annual attendance. Detailed land use plans and study of costs of access roads and onshore developments will be necessary to specifically determine the number of visitors that may be accommodated before the marginal costs exceed the marginal benefits. Expected attendance is summarized in Table 48.

TABLE 48
DOS RIOS RESERVOIR
EXPECTED ATTENDANCE 1980-2030

Year	:	Expected average annual attendance
1990	:	250,000
2000	:	250,000
2010	:	250,000
2020	:	250,000
2030	:	250,000

Decade	:	Expected attendance by decade
1980-1990	:	2,290,000
1990-2000	:	2,500,000
2000-2010	:	2,500,000
2010-2020	:	2,500,000
2020-2030	:	2,500,000

Present recreational use at the reservoir site consists of occasional use by hunters and fishermen. Public roads do not enter the site, therefore, use is restricted to property owners and their guests or members of hunting clubs who may have agreements with property owners to permit entry to their land. Some public domain land is found along the canyons of the reservoir site. In summary, recreation use of the Dos Rios Reservoir site and the prospective future recreation use of the reservoir site are of such a low order that the attendance estimates may be considered net attendance attributable to the development of the reservoir.

English Ridge Reservoir

English Ridge Reservoir, with a storage capacity of 1.8 million acre-feet, would be created by a 535-foot high dam on the Upper Main Eel River. At normal pool elevation, 1,695 feet, the reservoir would have

a water surface area of 11,500 acres and back water up the Eel River Canyon for 25 miles. In addition, sizeable arms of the reservoir would extend into the Tomki and Salt Creek drainages. The largest and most popular recreation developments would probably be located around the bay of the reservoir extending into the valley of Salt Creek. Facilities permitting access to the water at all levels including minimum pool could be constructed in this area. Several other sites could be developed to permit access to the water. Although much of the shoreline would be steep and inaccessible, sufficient land is available to accommodate the foreseeable need for access to the reservoir. Estimates of recreation are based on completion of the reservoir by 1980. The attendance estimates are presented in Table 49.

TABLE 49

ENGLISH RIDGE RESERVOIR
EXPECTED ATTENDANCE 1980-2030

Year	:	Expected average
	:	annual attendance
1990		967,000
2000		1,330,000
2010		1,763,000
2020		2,242,000
2030		2,787,000
Decade	:	Expected attendance
	:	by decade
1980-1990		5,420,000
1990-2000		11,485,000
2000-2010		15,465,000
2010-2020		20,025,000
2020-2030		25,145,000

Additional recreation benefits at Lake Pillsbury could result from the development of English Ridge Reservoir. With English Ridge

Reservoir in operation it would be possible to maintain a nearly stable water surface elevation at Lake Pillsbury. This situation combined with a new forest highway into the lake should stimulate a considerable increase in recreation development and use.

The loss of recreation use resulting from the inundation of existing resorts and recreation areas, particularly along the Eel River, amounting to approximately 10 percent of the recreation use following completion of the project have been deducted from the attendance estimates. Table 50 summarizes the attendance estimates by decades at Upper Eel River Reservoirs.

TABLE 50
SUMMARY OF NET ATTENDANCE ESTIMATES
UPPER EEL RIVER RESERVOIRS (1980-2030)

Decade	Spencer	Dos Rios	English Ridge	Total
1980-1990	1,005,000	2,290,000	4,878,000	8,173,000
1990-2000	1,989,000	2,500,000	10,336,000	14,825,000
2000-2010	2,556,000	2,500,000	13,918,000	18,974,000
2010-2020	3,204,000	2,500,000	18,022,000	23,726,000
2020-2030	<u>3,938,000</u>	<u>2,500,000</u>	<u>22,630,000</u>	<u>29,068,000</u>
50-Year Total	12,692,000	12,290,000	69,784,000	94,766,000

Trinity River Development

The Trinity River Development consists of three stages, the Trinity Diversion Project, South Fork Trinity Project, and the Mad and Van Duzen Project. The reservoirs included in the three stages are: Helena, Eltapom, Ruth, Eaton, and Butler Valley. It is anticipated that construction of this development would be concurrent with or follow the

Upper Eel River Development. Although Trinity River Development could be constructed in three stages, the consideration of the individual recreation aspects in this report is based on a common 1980 completion date.

Trinity Diversion Project--Helena Reservoir

Helena Reservoir with a storage capacity of 2.8 million acre-feet would be the major storage feature of this project. A 590-foot high dam at the Helena site on the Trinity River would impound a reservoir with a normal water surface elevation of 1,840 feet and a surface area of over 24 square miles. The maximum fluctuation would be approximately 190 feet.

Helena Reservoir would back water up to the toe of Lewiston Dam, the structure that presently reregulates and diverts water from the U. S. Bureau of Reclamation's Trinity Reservoir to Whiskeytown Reservoir on Clear Creek. Water would also be diverted from Helena Reservoir to Clear Creek. With exception of the smaller maximum drawdown, Helena will, from the recreation viewpoint, resemble Trinity Reservoir.

Table 51 shows a comparison of the physical characteristics of the possible future Helena Reservoir with those of nearby reservoirs that are now popular recreation sites.

TABLE 51
PHYSICAL COMPARISON OF
HELENA, SHASTA, AND TRINITY RESERVOIRS

Item	: Helena	: Shasta	: Trinity
Height of dam, in feet	590	487	465
Normal pool			
elevation, in feet	1,840	1,037	2,370
surface area, in acres	15,700	29,500	16,400
Minimum pool			
elevation, in feet	1,650	828	2,145
fluctuation	190	209	235

The method used to estimate recreation attendance in this report indicates that the location of Helena Reservoir in relation to population would not result in very large expected attendance figures. Helena, like Shasta and Trinity Reservoirs, would have a shoreline that includes many steep-sided canyons that would possibly add to the scenic qualities, but would not accommodate any type of lakeshore activity. Nevertheless, the locations where access could be gained to the reservoir would undoubtedly prove adequate in relation to need. The choice of public access sites would be influenced by the routes chosen for the relocated roads and highways. Decisions on road relocations may also modify use estimates.

Although the location of the Helena Reservoir site in relation to that of the state population indicates a relatively low level of expected attendance, the visitors should be attracted from throughout the State with no one area providing the majority of the visitors. The origin of visitors is summarized in Table 52. The geographical areas are the same as those used in the previously presented "Trinity Lake District Study of 1956" and the "Tannery Gulch Campground 1962" summaries.

TABLE 52

PLACE-OF-RESIDENCE OF VISITORS
PROPOSED HELENA, TRINITY LAKE DISTRICT,
1956 (PRE-TRINITY LAKE),
AND TANNERY GULCH CAMPGROUND,
1962 (ON TRINITY LAKE)

User-origin	: Helena, : in percent	: Trinity 1956, : in percent	: Trinity 1962, : in percent
Local	26	31.9	5.8
North Valley	23	10.2	24.0
San Francisco Bay Area	27	35.0	33.2
Eureka Coast	5	5.0	18.2
Los Angeles Area	9	7.5	15.0
Other (California)	14	8.6	3.8
Out-of-State	--	1.8	--

The three origin-of-visitors tabulations do not measure identical types of use. "Trinity 1962," for example, is a summary of camp registration addresses at a pay campground. Therefore, many local residents who visit Trinity Lake were not included.

Experience at Trinity Lake indicates that use by residents of the Eureka Coast would probably exceed estimates. The higher than estimated use by coastal area residents might be offset by lower than estimated use from the Northern Sacramento Valley, an area with an abundant, and increasing, supply of water-oriented recreation opportunities. Statewide interest in the recreation resources of Helena Reservoir is indicated by the user-origin. The State would be the logical governmental agency to provide and operate the recreation facilities.

The attendance estimates for Helena Reservoir for the fifty-year period following the assumed completion date are presented in Table 53.

TABLE 53

HELENA RESERVOIR
EXPECTED ATTENDANCE 1980-2030

Year	:	Expected average annual attendance
1990	:	263,000
2000	:	362,000
2010	:	480,000
2020	:	610,000
20307	:	758,000

Decade	:	Expected attendance by decade
1980-1990	:	1,473,000
1990-2000	:	3,125,000
2000-2010	:	4,210,000
2010-2020	:	5,450,000
2020-2030	:	6,840,000

The Helena Reservoir site receives recreational use at the present time that is of considerable magnitude. The site includes extensive private developments to accommodate Trinity River visitors as well as U. S. Forest Service and U. S. Bureau of Land Management developments. The site is moderately popular with summer recreationists; however, unlike many areas, the anadromous fishery results in continued heavy visitation by sportsmen throughout much of the balance of the year. Trinity and Lewiston Reservoirs made it necessary to build the "worlds most modern fish hatchery" in order to maintain the previously existing fishery. The Helena Project would also include measures to protect the fish. The actual streams and stream fishing opportunities in the reservoir site, however, would be lost.

South Fork Trinity Project and Mad and Van Duzen Project

A possible second stage (South Fork Trinity Project) of the Trinity River Development would involve construction of Burnt Ranch and Eltapom dams and reservoirs. The third stage (Mad and Van Duzen Project) would include Enlarged Ruth, Eaton, and Butler Valley Reservoirs. Preliminary attendance estimates and comments concerning the above reservoirs are presented in Table 54.

TABLE 54

EXPECTED ATTENDANCE FOR RESERVOIRS OF
SOUTH FORK TRINITY PROJECT AND
MAD AND VAN DUZEN PROJECT

Year	Second Stage		Third Stage		
	Burnt Ranch	Eltapom	Ruth	Eaton	Butler Valley
1990	89,000	170,000	178,000	255,000	712,000
2000	122,000	234,000	245,000	351,000	979,000
2010	162,000	310,000	325,000	465,000	1,399,000
2020	206,000	394,000	413,000	591,000	1,651,000
2030	257,000	490,000	513,000	735,000	2,052,000
<u>Decade</u>					
1980-1990	499,000	953,000	997,000	1,430,000	3,993,000
1990-2000	1,057,000	2,020,000	2,115,000	3,030,000	8,455,000
2000-2010	1,423,000	2,720,000	2,850,000	4,080,000	11,890,000
2010-2020	1,843,000	3,520,000	3,690,000	5,280,000	15,250,000
2020-2030	2,315,000	4,420,000	4,630,000	6,630,000	18,505,000

Burnt Ranch Reservoir attendance estimates are considerably lower than would be expected from its location in relation to present population. The reasons are: the canyon is steep-sided throughout the length of the reservoir site; better recreation sites at Helena Reservoir would attract most of the visitors who would approach the reservoir from an easterly direction; and, Helena Reservoir would tend to utilize the available funds for recreation user accommodations. The recreational

use of Burnt Ranch Reservoir probably will not exceed the recreation activity that would take place without the reservoir.

Studies of Eltapom Reservoir site have included consideration of two reservoir elevations. The higher, requiring a 645-foot high dam, would permit diversion of water directly into Helena Reservoir without the construction of Burnt Ranch Reservoir. The lower level, with a 330-foot dam, would allow diversion into Burnt Ranch Reservoir for pumped transfer to Helena Reservoir.

The location of Eltapom Reservoir receives only moderate recreational use. The U. S. Forest Service maintains a campground near the damsite and several private cabins and campgrounds offer limited facilities for fishermen. Continued improvement of the Peanut Road may bring more visitors into the area; however, the prospect of exceptionally large increases is not readily apparent.

The construction of the Lower Eltapom Dam would impound a body of water with a maximum water surface of 4,600 acres. Road access from the west is poor or circuitous; however, the area is readily accessible from the east. An improved Peanut Road (State Sign Route 36) will provide easy travel between Red Bluff and the headwaters of Hayfork Creek. Although the present road network of the South Fork Trinity watershed is not developed to a high standard, serviceable paved roads of moderate grade provide access to the watershed from either State Route 36 or U. S. 299.

In addition to having the prospect of reasonably good road access from the east, the land adjacent to the lower-level Eltapom Reservoir will accommodate a large recreational use. The recreational use should at least equal the listed estimates.

The higher elevation Eltapom Reservoir would present a different situation. Most of the terrain with moderate topography would be inundated. Although the normal water surface area would be approximately 11,000 acres, the increased water surface area probably would not result in greater recreational attendance than would occur if the reservoir were constructed to the lower level.

Eaton, Enlarged Ruth, and Butler Valley are three of several possible reservoir sites that could be developed as part of a plan to divert Van Duzen and Mad River waters into Eltapom Reservoir on the South Fork of the Trinity River.

Enlarged Ruth Reservoir would inundate the present Ruth Reservoir and the onshore recreation facilities. The reservoir shore would extend up the sides of the Mad River Canyon where the land is steeper, and more difficult to develop for recreational uses. The new reservoir would impound a longer and wider body of water than the existing reservoir but probably would not receive greater use.

The method used to predict attendance at proposed reservoirs can be verified by comparing the actual use at Ruth Reservoir with the predicted use. The existing Ruth Reservoir received 39,600 visitor-days of attendance during its second year of operation (1963). Predicted attendance at an Enlarged Ruth Reservoir, assumed the same as for the existing, under 1960 population, leisure time, disposable income, and mobility conditions was 44,000 visitor-days annually.

The place-of-residence information collected by U. S. Forest Service personnel at Ruth Lake during the summer of 1963 has been

summarized so the information can be compared with the corresponding components of the 44,000 visitor-days. This comparison is presented in Table 55.

TABLE 55

RUTH LAKE
PLACE-OF-RESIDENCE OF
RECREATION USERS
(In percent)

County group ^{1/}	Place-of-residence of recreation visitors	
	Sample by U.S.Forest Service:	Predicted for
	existing Ruth (1963)	Enlarged Ruth
Southern California	1.4	12.8
San Francisco Bay	9.3	22.7
San Joaquin Valley	--	7.5
Central Coast	--	1.0
Mountain Counties	--	.9
Northeast Counties	20.2	26.2
North Coast Counties	66.9	28.9
Out-of-State	<u>2.2</u>	<u>--</u>
TOTAL	100.0	100.0

The problems associated with recreational use of Eaton Reservoir would be similar to those at Enlarged Ruth and other reservoirs where the water line follows steep-sided canyons.

Additional water conservation yield from the Van Duzen River watershed could be developed if Larabee Valley Dam and Reservoir were constructed to divert water from the South Fork of the Van Duzen River into Eaton Reservoir. Larabee Valley Reservoir would be similar to Eaton Reservoir in surface area and operation characteristics. Larabee Valley Reservoir would probably be preferable to Eaton Reservoir from the standpoint of desirability for recreational development and use. The site is closer than Eaton and Ruth Reservoir sites to the population center around

Humboldt Bay. The lands adjacent to the reservoir would accommodate extensive onshore recreational developments. If both Eaton and Larabee Valley Reservoirs were constructed, Larabee Valley Reservoir would be the preferable location for recreational development. However, separate attendance estimates have not been prepared for Larabee Valley Reservoir inasmuch as they would be nearly the same as those for Eaton.

Butler Valley Reservoir on the Mad River would accommodate a recreation development which would partially satisfy the need of the Humboldt Bay Area residents for reservoir type recreational opportunities. All the land reasonably close to the reservoir that can accommodate public recreation will eventually be needed if the large numbers of prospective visitors are to be accommodated. The availability of such land will probably, in the long run, limit the attendance if this reservoir is constructed.

Lower Eel River Project

Following construction of the Upper Eel River and Trinity River Developments, increasing demands for water may eventually necessitate development of the Lower Eel River. Major features of the proposed Lower Eel River Project are Sequoia and Bell Springs Reservoirs. For the purposes of this report, it is assumed that both reservoirs would be completed in 1990.

While the majority of the recreational users at reservoirs of Upper Eel River Development would be residents of Central California, particularly San Francisco Bay area counties, Sequoia and Bell Springs Reservoirs would provide water-associated recreational opportunities

primarily for the residents of the North Coast counties in which they are located. Sequoia Reservoir will be of special value to residents of the Humboldt Bay metropolitan area where the residents have historically sought out warmer inland areas for their recreational activities. The distribution of place-of-residence of the recreational users of these reservoirs is summarized in Table 56.

TABLE 56
PLACE-OF-RESIDENCE OF VISITORS
SEQUOIA AND BELL SPRINGS RESERVOIRS

Location of Residence <u>1/</u>	: Bell Springs : Percent of Users	: Sequoia : Percent of Users
Humboldt County	2	71
Mendocino County	50	6
Southern California	3	3
San Francisco Bay Area	32	13
Other Counties	13	7

The distribution of origin of visitors may vary considerably from the above estimates, especially at Sequoia Reservoir, where tourist sightseers, while traveling through the redwood groves, will also take the 10-mile side trip to see a major dam and reservoir.

The dam presently considered as a possible future development at the Sequoia site would be a 640-foot high structure impounding a reservoir with a water surface area of over 36 square miles at the normal pool elevation of 740 feet. The fluctuation of the Sequoia Reservoir would be limited to about 95 feet by the location of the pumping plant transferring water into Bell Springs Reservoir. Bell Springs, on the other hand, may experience a maximum fluctuation of approximately 200 feet.

In summary, recreation studies to date indicate that the Sequoia Reservoir site is more favorably suited than the Bell Springs site in relation to populated areas in need of recreation opportunities. Sequoia Reservoir will also have a larger water surface area and a more moderate fluctuation of the elevation of the water surface than the upstream reservoir, Bell Springs.

While both reservoirs are located in the steep canyon of the Eel River, several opportunities exist for the development of access and recreation facilities at Sequoia Reservoir. The terrain at Bell Springs Reservoir will probably present greater obstacles to recreational development and use especially with the greater fluctuations that will be encountered. Much of the developable land adjacent to the Sequoia site is situated on the northeast side of the reservoir. Humboldt Bay residents who will constitute a large percentage of the visitors will be able to reach these areas by traveling through Bridgeville and the Larabee Valley. Access sites on the west side of the reservoir will be more difficult to develop.

The following table (Table 57) summarizes the attendance for which access and facilities will probably be needed at Sequoia and Bell Springs Reservoirs.

TABLE 57

ESTIMATED ATTENDANCE
SEQUOIA AND BELL SPRINGS RESERVOIRS
(1990-2040)

Year	Attendance	
	Sequoia Reservoir	Bell Springs Reservoir
2000	1,113,000	974,000
2010	1,476,000	1,291,000
2020	1,876,000	1,642,000
2030	2,332,000	2,041,000
2040	2,829,000	2,475,000
<hr/>		
Decade		
1990-2000	6,407,000	5,607,000
2000-2010	12,945,000	11,325,000
2010-2020	16,760,000	14,665,000
2020-2030	21,040,000	18,415,000
2030-2040	25,805,000	22,580,000

Present recreation use of the Lower Eel River reservoir sites is minimal, chief deterrents being poor access and steep terrain. Few roads enter or cross the strip of land included in these sites. Present population is low. These factors will undoubtedly continue into future years. The anadromous fisheries probably account for most of the current recreation activity-days. While these reservoirs will eliminate the anadromous fisheries above the damsite, their greatest influence will be downstream and in the ocean. It is the province of the Department of Fish and Game to recommend the measures necessary to preserve the downstream fishery. While the fish runs themselves may be preserved by artificial (hatchery) measures, there will be a loss of stream fishing opportunities and attendant fisherman activity-days. The recreation resource that will be created if the Lower Eel River projects are

constructed will probably accommodate recreation activities-days many times greater than would be accommodated along the canyons in the reservoir sites if the projects were not constructed.

Humboldt Reservoir

Increasing statewide water demands may necessitate construction of a major water development project on the Klamath River around the turn of the century. One of the plans under consideration includes Humboldt Reservoir, which would be located near the mouth of the Klamath River. At normal pool, the proposed reservoir will have a water surface elevation of 765 feet and a surface area of 87.5 square miles. Such a body of water is so large that it seems appropriate to note that the total surface area of all water bodies in California is only a little over 2,000 square miles and that the largest body of water within or partly within California is 190-square mile Lake Tahoe.

The Humboldt Reservoir considered in this report would flood out much of the Lower Klamath and Lower Trinity Rivers. The main arm in the canyons of the Klamath will be 63 miles long. An arm of the reservoir would extend from the mouth of the Trinity River to the base of Ironside Mountain Dam, a distance of about 30 miles. Sizeable bays would extend up several other tributary streams.

Many miles of the shore of the proposed reservoir are bordered by precipitous canyons aggravating road relocation and new road development. Land access to much of the shoreline probably will not be possible. The most probable approaches to the reservoir will be from the Humboldt Bay area over the present route of U. S. Highway 299 to the vicinity of Willow Creek and the Hoopa Valley, or down either the Trinity River or Klamath River canyons if approaching from the east. Undoubtedly, if

the project is constructed the reservoir surface would be used for rafting forest products and by barge and other forms of boat traffic. Thus, public water travel will be possible through the reservoir or to any point on the shore where access will be needed. Attendance estimates for Humboldt Reservoir have been adjusted upward in light of the unusual size and other positive elements associated with this proposal. These estimates, summarized in Table 58, assume an arbitrary completion date of 2000.

TABLE 58
HUMBOLDT RESERVOIR
ESTIMATED ATTENDANCE 2000-2050

Year	:	Attendance
2010		2,523,000
2020		3,187,000
2030		3,988,000
2040		4,837,000
2050		5,784,000
<hr/>		
Decade		
2000-2010		14,753,000
2010-2020		28,550,000
2020-2030		35,875,000
2030-2040		44,125,000
2040-2050		53,105,000

Table 59 shows a comparison of the predicted places-of-residence of the prospective users of Humboldt Reservoir and those of the present recreation users who would be displaced by the construction of the reservoir.

TABLE 59

PLACE-OF-RESIDENCE OF VISITORS
HUMBOLDT RESERVOIR AREA
(In percent)

Area (by county group) ^{1/} of user-origin	:		:	
	Humboldt		Boat rentals	
	Reservoir		Camp receipts	
			Requa boat dock:	Oak Flat campground
			Klamath estuary:	Klamath North Fork
Southern California	3.3		37.6	21.8
San Francisco Bay Area	5.9		22.0	32.3
San Joaquin Valley	2.4		13.5	7.2
Central Coast	.3		1.2	5.1
Mountain Counties	.3		.8	.3
Northeastern Counties	19.1		1.2	13.6
North Coast	68.7		20.8	17.5
Total California	100.0		97.1	97.8
Out-of-State	---		2.9	2.2
TOTAL	100.0		100.0	100.0

The differences in the places-of-residence of present users of the reservoir site and that of users if the reservoir is constructed may be explained by considering the nature of the recreation opportunities under the different circumstances.

Humboldt Reservoir would be an exceptionally large body of water that would be heavily utilized by residents of the growing Humboldt Bay metropolitan area. Recreational activities would include swimming, boating, water skiing, fishing, and similar activities. The need for facilities to permit boat launching, or camping and picnicking while engaged in reservoir recreation would be extensive. Residents of the growing metropolitan Humboldt Bay area would find the climate ideal.

Humboldt Reservoir would eliminate the salmon and steelhead runs that now attract large numbers of visitors from throughout California. If this took place, fewer people would travel great distances to the Klamath River country. Unless the ardent salmon or steelhead fisherman

can find another outstanding stream, the Smith for example, he will probably turn to some substitute such as ocean fishing or warmwater fishing, or reservoir fishing. Humboldt Reservoir being a deep, cold, fertile reservoir will probably provide the new resource for many people, especially those who reside nearby. The residents of the San Francisco Bay Area or Southern California may turn to the Pacific Ocean, the Sacramento Delta or other closer reservoirs such as Knights Valley, Lake Berryessa, or the West Side Conveyance System. Few of the present or future salmon and steelhead fishermen from Central and Southern California could be expected to patronize the recreation areas of Humboldt Reservoir.

Humboldt Reservoir would have a deleterious effect on the recreational use of the Klamath River Delta, the area that would be inundated by the reservoir, and streams tributary to the reservoir site such as the Shasta, Scott, upper Klamath River and Salmon Rivers. The salmon and steelhead fisheries of these streams would be destroyed by a major dam near the mouth. If Humboldt Reservoir were constructed today, the new recreational use that would be attracted by the development of the new reservoir, even one as large as Humboldt Reservoir, would numerically (in visitor-days) total about 50 percent of the recreational use that would be displaced through the inundation of stream frontage and reduction of unique fishing resources.

Knights Valley Reservoir

Knights Valley Reservoir would be impounded by the construction of dams on Franz and Maacama Creeks, tributaries to the Russian River. Numerous alternative plans for the development of Knights Valley Reservoir

site have been considered by state and federal agencies. For purposes of this discussion the proposed reservoir would have a gross storage capacity of 280,000 acre-feet with a normal pool elevation of 445 feet and a water surface area of 4,300 acres. Under this plan, water would be diverted by tunnel into the Napa Valley watershed near Calistoga. The reservoir would have a relatively high (350-foot elevation) minimum pool and moderate fluctuation (95-foot maximum) of water surface.

The reservoir site is located close to the growing suburban population centers of the North Bay Area. Santa Rosa is about 20 miles away, and Healdsburg and Calistoga are about 10 and 6 miles, respectively. The construction of the reservoir should accelerate residential development of nearby lands.

The terrain adjacent to the reservoir site is unusually well-suited for park and recreation use as evidenced by the fact that the proposed reservoir would extend into land that is currently being proposed for acquisition for state park purposes.

Considering the terrain and reservoir operation, it appears that the population-distance relationship for Knights Valley provides a minimum estimate of the attendance that might be expected at a reservoir at the Knights Valley site.

Table 60 summarizes the attendance which could be expected and for which recreation facilities would be needed if the project were completed in 1970.

TABLE 60

KNIGHTS VALLEY RESERVOIR
EXPECTED ATTENDANCE 1970-2020

Year	:	Expected average annual attendance
1980		2,196,000
1990		3,219,000
2000		4,430,000
2010		5,873,000
2020		7,467,000

Decade	:	Expected attendance by decade
1970-1980		11,973,000
1980-1990		27,075,000
1990-2000		38,245,000
2000-2010		51,515,000
2010-2020		66,700,000

Present recreation use of Knights Valley is relatively low. Until the proposed Mount St. Helena State Park becomes a reality, it is probable that recreation use will remain at a low level. When the state park is developed, the reservoir and associated recreation developments should supplement the park rather than eliminate or compete with the established facility. Therefore, the attendance figures are considered to be approximately net attendance and to measure the recreation enhancement that may result from the construction of the reservoir.

NOTES: CHAPTER XVIII

1. Counties classified into groups in accordance with "Population--Historical and Projected for Regions and Counties," State of California, Department of Water Resources, September, 1960, as follows:

Southern California: Kern, Los Angeles, Orange, Riverside, San Bernardino, San Diego, San Luis Obispo, Santa Barbara, Ventura, Imperial.

San Francisco Bay: Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, Sonoma.

San Joaquin Valley: Fresno, Kings, Madera, Merced, Sacramento, San Joaquin, Stanislaus, Tulare.

NOTES: CHAPTER XVIII (Continued)

Central Coast: Monterey, San Benito, Santa Cruz.

Mountain Counties: Alpine, Amador, Calaveras, El Dorado, Inyo, Mariposa, Mono, Nevada, Placer, Tuolumne.

Northeastern Counties: Butte, Colusa, Glenn, Lake, Lassen, Modoc, Plumas, Shasta, Sierra, Siskiyou, Sutter, Tehama, Trinity, Yolo, Yuba.

North Coast: Del Norte, Humboldt, Mendocino.

CHAPTER XIX. WATER TRANSFER ROUTES

The need to develop additional water supplies in the North Coastal area requires that not only the reservoir developments be considered but also the method by which the water will be transferred into the Sacramento River Basin and regulated to permit its use when needed. Four principal transbasin water transfer routes are being considered (see Plate No. 1). Two are alternative routes for diversion of the Eel River, and two are alternative routes for diversion of the Trinity River. The four principal transfer routes are:

1. Transfer of water from the Middle Fork Eel and Upper Main Eel via Garrett Tunnel into the Clear Lake watershed. The water would then pass through Clear Lake and be transferred via the Soda Creek Tunnel into Lake Berryessa for reregulation and release.

2. Transfer of water from Middle Fork Eel reservoirs via tunnel into the Glenn Reservoir complex.

3. Transfer of the water from Helena Reservoir via a Clear Creek Tunnel into Clear Creek and the existing Whiskeytown Reservoir. The route could also involve additional reservoirs on Clear Creek above and below Whiskeytown Reservoir.

4. Transfer of the water from Helena Reservoir via a Cottonwood Creek Tunnel to the West Side Conveyance System and then to the Glenn Reservoir Complex for reregulation and release.

As is the case with many other water development proposals, one or some combination of the features of one or more of the above plans could be utilized. The following discussion provides a current

appraisal of the recreational aspects of the different conveyance routes and points out some of the associated problems.

Clear Lake-Lake Berryessa Diversion

Two alternative routes including large storage facilities have been considered for transferring surplus Eel River water to the Sacramento-San Joaquin Delta. One route would utilize the Glenn Reservoir on the westside of the Sacramento Valley. The other route would involve the transfer of Eel River water via Clear Lake and Lake Berryessa.

Clear Lake has been a mecca for recreationists since the days of the Gold Rush. An early edition of Hutchings California magazine mentions a recreational visit to the Clear Lake area during the year 1852. This trip was made by a group of San Franciscans for the specific purpose of enjoying the wilderness environment then found around Clear Lake. The wilderness nature of Clear Lake soon was lost to the inroads of settlement and civilization.

During historic times, Clear Lake has been drained by Cache Creek, a tributary of the Sacramento River. The outlet of Clear Lake is partially controlled by a dam constructed in 1914. Under court decree, the maximum storage in the lake is 7.56 feet above an arbitrary level referred to as 0.0 on the Rumsey gage. During most months, the lake level remains below the 7.56-foot level; however, during floods the lake level may rise to 10 to 12 feet above the gage due to the inability of the outlet to accommodate the runoff.

If the Clear Lake route were adopted, an additional outlet from Clear Lake would be constructed to permit diversion into Lake Berryessa. Such an outlet would allow flood flows to escape and thus

eliminate much of the surcharge that now builds up during periods of heavy runoff. During periods of other than flood flow, the lake could be stabilized by temporary retention of Eel River water. The actual details of the Clear Lake water elevation regulation could be adjusted to accommodate the needs of the local interests without the loss of significant amounts of water and while still guaranteeing the present yield to Cache Creek water users.

The planned Upper Eel River Development could result in the annual passage of more than 500,000 acre-feet of water through Clear Lake. In passing through the lake the Eel River water would mix to some extent with the 1,100,000 acre-feet of water held in Clear Lake. The routing of the Eel River water through Clear Lake could change the nature of that body of water. It is anticipated that the overall effect of this routing on Clear Lake, in conjunction with the modification of the outlet and reduction of lake level fluctuation would be favorable.

Some of the problems of the Clear Lake area could be solved by routing Eel River water through the lake. Winter floods could be controlled, and there could be a reduction in the over-all range of lake level fluctuation. Presumably these changes would reduce the development and maintenance costs for items such as boat docks while the mixing of Eel River water with Clear Lake water would maintain attractive water conditions.

A beneficial effect of Eel River water could be the lowering of water temperatures in Clear Lake. The lower water temperatures could favor cold water fish, reduce growth of algae and associated conditions accompanying high water temperatures, and slow down the growth rate of Clear Lake gnats. Eel River water would have some cooling effect on

Clear Lake water; however, the influence probably would not be extensive. Clear Lake is an exceptionally large shallow body of water, the temperature of which is directly influenced by air temperatures. Trout fishing would probably improve near the point where cold Eel River water entered the lake; however, like the water now entering Lake Mendocino, the cold entering water would not be able to retain its low temperature throughout the lake because of the warming effect of the shallow lake basin.

However, careful consideration must be given to the possible results of altering Clear Lake before presenting claims for future recreation benefits (increases in recreation attendance over and above the growth that will undoubtedly take place in the Clear Lake area in future years without the modification brought about by the selection of this route). One principal concern revolves around the effect of changes in the water quality of Clear Lake.

An indication of what could happen to Clear Lake as a result of importing Eel River water can be surmised by what has happened to Lake Mendocino on the Russian River. Lake Mendocino stores water originating in the watershed of the Upper Main Eel River. Water originally stored in Lake Pillsbury on the Eel River is diverted at Van Arsdale Dam via the Potter Valley Tunnel into the East Fork of the Russian River above Lake Mendocino. One of the Lake Mendocino problems results from the suspended solids carried in the water. Poor watershed conditions above Lake Pillsbury contribute high silt loads to the streams draining the area. The material does not settle out even though the water passes through Lake Pillsbury, Lake Van Arsdale, and is also stored in Lake Mendocino. Water releases from Lake Mendocino transmit the poor quality water to the Russian River throughout the year. If the

same turbid-type Eel River water were routed to Clear Lake, problems similar to those at Lake Mendocino would probably exist.

Another problem may be created in the Clear Lake area if the management of the Eel River watershed and storage of water in Lake Pillsbury and English Ridge reservoirs permits clear water to mix with the existing Clear Lake water. Some concern has been expressed over the possibility of stimulated growth of aquatic vegetation, producing swamp conditions over much of the lake area. Reduction of the turbidity of the lake would increase the penetration of solar energy which in turn would favor the growth of rooted vegetation. Even under existing conditions vegetative growth creates a problem at some Clear Lake beaches. The reduction of the fluctuation in Clear Lake, while beneficial as regards flood control, could also result in increased vegetation to an extent that would have an unfavorable effect on recreational use.

The turnover of water resulting from the routing of Eel River water through Clear Lake could lower the nutrient content of the water and thus reduce the production of algae and in turn reduce the problems brought on by algae blooms. However, the algae is responsible to a large extent for the water turbidity that hampers light penetration and growth of rooted plants.

Consideration of possible benefits at Clear Lake presupposes that present conditions are not the optimum possible in that location. The recreational use of the Clear Lake area was estimated in 1958 by Wilsey and Ham in "Cache Creek Basin Recreation Study". Estimates prepared in the course of that study indicated that the total visitor-days by nonbasin residents during 1958 came to 2,300,000 visitor-days.^{1/} If an

imaginary conservation reservoir were located in the Clear Lake site, it is estimated that the reservoir would have attracted 403,000 visitor-days of recreational use in 1960. The existing attractions and facilities at Clear Lake result in the attendance of about six times as many people as would be attracted to an area lacking these assets.

Several characteristics of Clear Lake contribute to the high level of recreational use.

1. The lake has an unusually large water surface area, 43,000 acres.
2. Extensive land adjacent to the lake is suitable for recreational uses.
3. Developments to accommodate visitors have not been limited to one level of government or to private initiative.
4. The lake does not experience the drastic change in water surface area and elevation found at fluctuating reservoirs.
5. The fluctuation of the lake level is sufficient to assist the natural development of beach areas. The fluctuation also discourages aquatic plants. The range in water surface elevations is small enough to permit the construction and use of permanent boat docks and other service facilities.

Several factors affecting recreation use of the Clear Lake area may not be changed materially by the routing of Eel River water through the lake.

1. The climate will not change because of the routing of the water.

2. The temperature of the large shallow lake will continue to reflect the air temperature. Probably most of the lake will experience water temperatures similar to those found at present. Algae bloom and fish die-off may not be eliminated to the extent anticipated.

3. The growth of onshore habitation will necessitate continued extension and modernization of sewage disposal facilities. It may be necessary to accelerate the improvement of these facilities to protect the quality of the water passing through Clear Lake. The stabilization of Clear Lake may raise the water table under lands adjacent to Clear Lake and reduce the efficiency of some of the existing septic tank leaching installations.

4. Clear Lake gnats probably will not be reduced to a significant extent. The gnats are found in Lake Pillsbury, Van Arsdale, and Mendocino, all impoundments of Eel River water. The large breeding area at Clear Lake will continue to produce swarms of gnats unless control measures are continued.

Present lack of a degree of certainty concerning the effects of routing Eel River water through Clear Lake indicate that further study of the problem areas is needed before evaluating the route in terms of increases in visitor-days of recreational use. An estimate of no change in visitor-days of recreation use is recommended at this time.

Lake Berryessa. Lake Berryessa, which was completed in 1957, has a maximum storage capacity of 1,600,000 acre-feet of water with a surface area of 20,700 acres. The recreation features of the lake are administered by the County of Napa. Fishermen are allowed free access to the lake shore. Additional access and facilities have

been provided through leasing lakeshore land to private concessioners and allowing them to develop the facilities needed by the recreation service seeking visitor. Facilities provided through the investment of private capital include boat launching ramps, marinas, swimming beaches, swimming pools, restaurants and other retail outlets, picnic sites, campsites, trailer sites, motels, mobile home rentals, and sites for homes and mobile homes. Approximately five million dollars have been invested in the private facilities and the developers plan to invest similar large sums in the next few years.

The development of a Greater Lake Berryessa would increase the storage capacity of the reservoir from 1,600,000 acre-feet to about 14,000,000 acre-feet. The water surface at normal pool would be increased from 20,700 acres to 66,000 acres, or 103 square miles. The experience gained at the existing Lake Berryessa demonstrates that a large body of water in this location will be heavily patronized even if the summer climate is hot and dry and the vegetation typifies such locations; brush types such as chamise, manzanita, ceanothus, and toyon and limited tree growth consisting largely of blue oak and digger pine.

Available evidence, such as the willingness of private investors to expend money to expand recreation facilities and population growth estimates for nearby counties, indicates that recreational use of Lake Berryessa will experience considerable growth in the near future.

A difficult problem is encountered in estimating the recreational use that could be expected at Greater Lake Berryessa. The problem revolves around the long-term fluctuation of the proposed reservoir.

While a single dry year would have slight effect on the reservoir, if a dry spell were sufficiently severe the reservoir could be drawn down drastically and many years of above normal rainfall would be required to bring the storage back near the maximum. A situation similar to that following a long dry cycle would be encountered during the first years following construction of the reservoir.

Estimates have not been made of the extent of increase or decrease in recreational use resulting from the modification of the reservoir at Lake Berryessa. Probably the Greater Lake Berryessa with 368 miles of shoreline would attract greater use when it is nearly full than the existing lake would attract. During the initial filling of the reservoir, as well as during dry cycles and the years of refilling following a drawdown, recreation visits would probably be lower than would have occurred at the recreation developments at the existing lake. It is recommended that an estimate of no increase in visitor-days of recreational use (above that growth that will continue at the existing Lake Berryessa) be assigned to the Greater Berryessa project until more information is available.

Glenn Reservoir Complex

The Glenn Reservoir complex, which could be utilized in an alternative routing of the Middle Fork Eel River, consists of three reservoir compartments -- Paskenta, Newville, and Rancheria. One or more of these compartments could also be utilized to reregulate diversions from the Trinity River and to conserve surplus flows of Thomes and Stony Creeks.

If all compartments of the complex were constructed to a normal water surface elevation of 950 feet the reservoir would have corresponding surface area (at normal pool) of 44,500 acres, equivalent to 69.5 square miles or slightly larger than Clear Lake, Lake County, California. The fluctuation of the Glenn Reservoir Complex possibly would not be so severe as the fluctuation of some of the Eel or Trinity River reservoirs from which the water would be diverted. It is possible that during periods of normal or above average rainfall it would be desirable to maintain Glenn at a level near maximum pool once sufficient water had been transferred to bring the water up to that level. The function of the Glenn Reservoir Complex has been described as being similar to a water bank in which water would be deposited for use during the extreme dry cycles.

The following estimate of attendance reflects the location of the reservoir in relation to the population of place-of-residence zones of successive 50-mile travel distances from the reservoir site. The evaluation probably does not reflect the effect of the exceptionally large size or probable stable water elevations that will occur during the majority of the years. However, neither has the site been discounted because of climatic conditions that will discourage mid-summer visitation by non-local users. Table 61 summarizes the attendance that might be expected at a large reservoir in the Glenn site.

TABLE 61

GLENN RESERVOIR COMPLEX
EXPECTED ATTENDANCE (1980-2030)

Year	:	Attendance
1990		1,618,000
2000		2,226,000
2010		2,951,000
2020		3,752,000
2030		4,665,000
<hr/>		
Decade		
1980-1990		9,073,000
1990-2000		19,220,000
2000-2010		25,885,000
2010-2020		33,515,000
2020-2030		42,089,000

The land adjacent to the site of the Glenn Complex could accommodate many times the number of users listed above.

Clear Creek Diversion

Planning studies indicate that the Clear Creek route is the most favorable plan for diversion of surplus flows from the Trinity River. The Clear Creek diversion route would include additional reservoirs on Clear Creek above and below Whiskeytown Reservoir. The new reservoirs, like Whiskeytown, would have limited water surface fluctuation. Their purpose would be for the development of hydroelectric power. These reservoirs would supplement the water-associated recreational opportunities now offered by Whiskeytown Reservoir. The additional water surface, potential recreational use sites, and increased accessibility of recreational opportunities resulting from the extension of water impoundment from

Whiskeytown Dam to the vicinity of U. S. Highway 99, should attract some additional reservoir recreation users.

While modest increases in reservoir recreation would result from the further development of Clear Creek, these benefits would probably be offset by losses in stream fishing and downstream fishing benefits. Extensive study of the potential of Clear Creek to accommodate anadromous fish should be made prior to evaluating over-all benefits or losses from the utilization of this route.

West Side Conveyance System

The West Side Conveyance System would in effect serve as a canal to transport surplus Trinity River water from the Cottonwood Creek Tunnel to the Glenn Reservoir Complex. The maximum water surface elevation would vary from 1,016 feet at Cottonwood Creek to 970 feet at Digger Creek, the point of entry into the Paskenta compartment of the Glenn Reservoir complex. Rather than follow the terrain into and out of side canyons, or construct siphons across draws, a series of dams would be constructed across many of the drainages. Each reservoir would overflow into a cut leading into the next reservoir to the south. In this manner the surplus flows of the various streams between Cottonwood Creek and Thomas Creek would also be controlled and diverted into the Glenn Reservoir Complex.

Sixteen reservoir developments are located along the 40-mile West Side Conveyance System route with a combined surface area of about 14,000 surface acres. The normal operations of the system would result in nearly stable water surface elevations and would permit boat travel throughout the system.

The water entering the West Side Conveyance System from the Cottonwood Creek Tunnel would probably be cold enough to maintain sufficiently low water temperatures in the northern compartments to encourage the development of a cold-water sport fishery. Possibly the units to the south would support warm-water species. The storage and depth at some of the units would also permit cold water releases in Cottonwood Creek, Red Bank Creek, and Elder Creek that would result in considerable downstream salmon and steelhead fishery enhancement. The benefits from an improved sports fishery might be realized not only along the banks of the streams involved but also along the Sacramento River and in the San Francisco Bay and Pacific Ocean.

The natural vegetation along the conveyance system route is dominated by chaparral, grass, chaparral-grass, and woodland-grass types. Blue oak and digger pine frequently occur on the hillsides while cottonwood, buckeye, oak, and willow are common along the stream courses. The brush-covered areas are typified by chamise, buckbrush, yerba santa, manzanita, and toyon. Many of the brush species, particularly the manzanita and toyon, approach tree form and would provide limited shade and screening at recreation developments.

The West Side Conveyance System would increase the recreational opportunities available to residents of the northern portion of the Sacramento Valley. That the citizens of this area already enjoy many water-associated recreation opportunities is attested to by the large numbers of pleasure boats registered in these counties. In 1963, Shasta and Tehama Counties ranked fourth and fifteenth, respectively, among the 58 California counties in registrations of pleasure boats per 1,000 county residents.

One of the attractions that accommodates much of the area's outdoor water recreation is Shasta Lake. Although the West Side Conveyance System will be about the same elevation as Shasta Lake, the rainfall at Shasta Lake averages about 60 inches per year while lands adjacent to the West Side Conveyance System average from 25 to 35 inches of rainfall per year. This difference in rainfall results in the more coniferous trees around the shores of Shasta Lake. Much of the heavy recreational use at Shasta Lake is attributable to its bisection by U. S. Highway 99. Although the West Side Conveyance System will be readily accessible from the northern Sacramento Valley, it will not be served by a major highway. Otherwise, the attributes of the West Side Conveyance System indicate that it will be more suitable for development and use for recreational activities than Shasta Lake. The shores of the West Side Conveyance System will pass through rolling hills with a high percentage of land that can be utilized for many recreational uses. The relative stability of water levels in the West Side Conveyance System will also favor recreational development and use.

Although a relatively large supply of water surface is available for public use in the Upper Sacramento Valley, the West Side Conveyance System could have been expected to have attracted 237,000 visitor-days of recreational use annually, if it had been available under 1960 conditions of population, leisure time, disposable income, and mobility. If the system were completed by 1980, the following attendance estimates would apply:

TABLE 62

WEST SIDE CONVEYANCE SYSTEM
EXPECTED ATTENDANCE
(1980-2030)

Year	:	Attendance
1990		958,000
2000		1,319,000
2010		1,749,000
2020		2,223,000
2030		2,764,000
<hr/>		
Decade		
1980-1990		5,373,000
1990-2000		11,385,000
2000-2010		15,340,000
2010-2020		19,860,000
2020-2030		24,935,000

Although the summer environment along the West Side Conveyance System route is too hot and dry to attract many visitors other than residents of the nearby area, the climate during the balance of the year has much to offer. The winters usually experience moderate rainfall with many clear, comfortable, fog-free days between storms. The spring and fall months are also attractive and the quality of the fishing should be especially good during these months. The West Side Conveyance System would supplement higher mountain recreation areas such as Deerlick Springs that are visited principally during the summer months.

Deerlick Springs data, Shasta-Trinity National Forest "Shasta Lake Study - 1958" data, and West Side Conveyance System user-origin estimates have been summarized by percentages to permit comparison of the three sets of data.

TABLE 63

WEST SIDE CONVEYANCE SYSTEM, DEERLICK SPRINGS,
AND SHASTA LAKE USER-ORIGIN COMPARISON
(Percent of Users by Area-of-Origin)

Point-of-origin	: West Side : : Conveyance : : System :registrations: : (estimated):	: Deerlick : : Springs : : (1962)	: Shasta : : Lake : : study : : (1958)
Local			39.1
Shasta County	42.6	14.2	
Tehama County	18.1	4.0	
Trinity County	.5	2.7	
North Valley			17.5
Other Northeast Counties ^{2/}	<u>7.6</u>	<u>23.0</u>	<u> </u>
TOTAL NORTHEAST COUNTIES	68.8	43.9	56.6
San Francisco Bay Area ^{2/}	16.9	18.9	26.5
Eureka Coast			3.1
North Coast	.9	23.0	
Los Angeles Area			9.2
Southern California ^{2/}	2.5	3.4	
San Joaquin Valley ^{2/}	9.2	2.7	
Central Coast ^{2/}	.4	2.0	
Mountain Counties ^{2/}	1.3	2.0	
Out-of-State		4.0	2.1
Other	<u> </u>	<u> </u>	<u>2.4</u>
TOTAL	100.0	99.9	99.9

NOTES: CHAPTER XVIX

1. Wilsey and Ham, "Cache Creek Basin Recreation Study"
(Millbrae, California, November, 1958)
2. Counties in each county group listed under note 1,
Chapter XVII

CHAPTER XX. SUMMARY

Superlatives have long been sought to adequately describe the recreational assets of the North Coastal area. The coast redwoods, the number one attraction, were noted in the journals of the earliest explorers. Throughout the succeeding years, the redwoods and other features such as the petrified forest and the geysers have solicited travelers from all parts of the world.

Early Events

Until the beginning of the present century the preservation, development, or exploitation of the recreational features of the North Coast resulted entirely from private initiative and investment. One early concept would have exploited the redwoods by displaying a specimen in the eastern states. Following the discovery of the Sierra redwoods at Calaveras Grove in 1852, the coast redwood forests near Trinidad were visited in an attempt to find the largest tree in the world. The searchers planned to fall and bark such a tree and ship the parts to the Eastern United States to be reassembled and displayed. However, no coast redwood could be found larger than the Sierra redwoods in Calaveras Grove.

During the 1860's the desirability of setting aside and preserving some of the North Coastal area's natural assets and of encouraging visitors to come to the North Coast began to be recognized. Redwood parks were proposed in the Russian River country. Private individuals also sought to gain a livelihood by displaying such wonders as the petrified forest and the geysers.

The beginning of the 20th century found railroad service being extended throughout the North Coastal area. The resulting availability of a convenient and economical means of travel brought about the development of what has been called the "playground for the San Francisco Bay Area" in the second growth redwood forests along the Russian River.

Government and Recreation

The Yosemite Grant of 1864 had marked the innovation of the concept of preserving public lands for recreational enjoyment. Subsequent proposals for redwood parks in the Russian River country and elsewhere recognized not only the desirability of preserving unspoiled examples of coast redwood forests but also great parks for "holiday outings" by San Francisco's working people as well as locations where even our poorest citizens would not be faced by the sign "Campers Keep Out." The year 1908 marks the establishment of Muir Woods National Monument in Marin County, the first of several North Coastal area tracts of coast redwoods to be permanently set aside for public enjoyment.

Additional tracts of redwoods were set aside in the North Coastal area largely as a result of the efforts of the Save-the-Redwoods League, following the popularization of the automobile and the attendant impact of this revolution in travel methods. Urban residents were no longer tied to railroad terminals or locations that could be reached by the slower available means of transportation such as horse drawn stage, ferry boat, or inter-coastal schooner. The automobile provided a convenient means of reaching any accessible location in the State. The problems generated by large numbers of motorists traveling to the scenic and recreation areas of the State occupied the attention of the State Forester in his bi-annual report covering the period 1917-18.

Problems Associated With Recreation

The population growth of California is probably the principal element that has resulted in the failure to abate the problems surrounding the recreational activities in the North Coastal area. The value of expanding our highway facilities continues to conflict with the values present in some of our finest redwood groves. The automobile-borne traveler continues to tax recreational facilities along major travel routes while the ease of travel permits the extension of his activity to the remotest area. Signs on private land reading "Campers Keep Out" have yielded to apologetic "Sorry, No Camp Sites Available" signs at the entrances to many public parks. Future years will witness continued growth of California's population and with it, increased need for outdoor recreational opportunities.

The further increase in reservoir development in California probably will not eliminate all the problems confronting those concerned with California's outdoor recreation resources. Most projects introduce additional problems resulting from the interruption of various activities dependent to some extent on the continued existence of the reservoir site in its natural condition.

Several North Coastal Area Investigation proposals will destroy existing recreational developments. In some cases these are of minimal value; however, there are some projects that will eliminate extensive existing recreation facilities. The most serious drawback of the reservoir proposals is associated with the loss of existing fish and wildlife habitat. The needed measures to minimize such losses are treated in the appendix prepared by the Department of Fish and Game.

Contributions of Proposed Reservoirs to Recreation

Water developments in the North Coastal area will create new recreational resources. The ability of the proposed reservoirs to contribute the resources needed for various recreational activities is discussed below.

Fishing - Although reservoir water surface fluctuations inhibit the development of outstanding fisheries, nearly all the better lake fisheries in California are located at artificial impoundments. Fishing at North Coastal reservoirs will probably be of satisfactory quality, even though far short of the outstanding quality now found in the Klamath River estuary and along other sections of the Klamath River system. It follows that the fisheries of the reservoirs will not draw sportsmen in such large numbers and from such great distances as is found along many of the streams of the Klamath River system. The place of residence of the reservoir fishermen will probably conform to a pattern similar to that found at Shelter Cove or Doran Park where fishing is the purpose of the visit of most of the campers or boat launchers. The added opportunities to participate in reservoir fishing should be reflected in the reputation of the North Coastal area as a good place to live. Lakes Pillsbury and Berryessa (both artificial lakes) also offer fishing opportunities that are probably similar to the opportunities that will be offered by future North Coastal area reservoirs.

Swimming - Steep sided reservoirs with large drawdowns are not conducive to the development of swimming beaches. Shasta Lake is an example of an existing reservoir presenting this problem. Like Shasta, some of the proposed reservoirs will accommodate swimming in conjunction

with other activities such as boating, camping, and fishing. A few of the proposed reservoirs, such as Eltapom, Larabee Valley, and units along the conveyance system routes will be able to offer combinations of developments such as campsites, picnic sites, and attractive swimming beaches. Knights Valley Reservoir recreational development plans should include swimming beaches adequate to accommodate large numbers of visitors from the nearby metropolitan area.

Boating - All the reservoir units will impound large enough bodies of water to accommodate large numbers of boats, both those used for fishing and those used for sailing, waterskiing, and associated activities.

Sightseers and Tourists - These classifications and associated activities, such as enroute camping, are not expected to swell the attendance rolls and tax the capacity of the reservoir recreation facilities. Most reservoir visitors will probably have the particular reservoir as the principal site to be visited during their trip. Visitors to existing reservoirs such as Lake Pillsbury and Lake Berryessa do not include a significant percentage of distant travelers.

Review of the characteristics of visitor attendance at several recreation attractions as well as the visitor participation in many types of recreation activities leads to the conclusion that the magnitude of recreational use of North Coastal area reservoirs will be closely associated with the distribution of population in relation to the reservoir site.

Outstanding Recreational Opportunities

Knights Valley Reservoir, as presently envisioned offers the greatest opportunity to create new recreational resources. The advantages of Knights Valley Reservoir result from its location in relation to growing.

North San Francisco Bay population centers, the probable water fluctuation pattern of the proposed reservoir, and the desirability of using adjacent terrain for recreational purposes.

Of the export routes considered for delivery of Eel River water to the State Water Project, those utilizing the development of the Glenn Reservoir complex are presently considered to offer a greater opportunity for increasing the recreational resources of the State than the route utilizing Clear Lake and Lake Berryessa.

Summary of Attendance and Place-of-Residence
Evaluation of Reservoir Proposals

For appraisal and comparison purposes all reservoirs considered in the North Coastal area have been evaluated in terms of visitor-days the reservoir might have received under 1960 conditions.

The following table summarizes the recreational visitor-days at individual proposed reservoirs, the gain or loss in visitor-days attributable to each reservoir, and the numbers and percentage of visitors from different county groups.

TABLE 64

RECREATION USE ESTIMATES FOR NORTH COAST RESERVOIR SITES
WITH AND WITHOUT WATER DEVELOPMENT - 1960 POPULATION,
LEISURE TIME, DISPOSABLE INCOME, AND MOBILITY CONDITIONS

Reservoir unit	: Estimated attendance : 1960 conditions : with project	: Estimated attendance : 1960 conditions : without project	: Gain or loss in attendance
Spencer	76,000	8,000	68,000
Dos Rios	101,000	No estimate	101,000
English Ridge	239,000	23,000	216,000
Clear Lake 1/	2,300,000	2,300,000	No net change
Greater Berryessa	934,000	934,000	No net change
Glenn Reservoir Complex	400,000	No estimate	400,000
Helena	65,000	65,000	No net change
Burnt Ranch	22,000	22,000	No net change
Eltapom	42,000	4,000	38,000
Enlarged Ruth	44,000	44,000	No net change
Eaton	67,000	7,000	60,000
Butler Valley	176,000	No estimate	176,000
West Side Conveyance	237,000	No estimate	237,000
Sequoia	200,000	No estimate	200,000
Bell Springs	175,000	No estimate	175,000
Humboldt	342,000	684,000	(-342,000)
Knights Valley	<u>796,000</u>	<u>No estimate</u>	<u>796,000</u>
Total with project	6,216,000		
Total without project		4,091,000	
Net increase in recreation attendance			2,125,000

1/ Exclusive of local and out-of-state residents.

TABLE 65

PLACE-OF-RESIDENCE OF RECREATION USERS
1960 POPULATION, LEISURE TIME, DISPOSABLE INCOME,
AND MOBILITY CONDITIONS
(County group^{1/} by annual attendance)

Reservoir project	: Southern : :California:	: San : :Francisco: Bay	: San : :Joaquin : Valley	: : :Central: Coast	: : :Mountain: Counties	: North- : : east : Counties	: North : : Coast : Counties
Spencer	6,000	36,000	10,000	1,000	1,000	4,000	18,000
Dos Rios	6,000	40,000	11,000	2,000	1,000	6,000	35,000
English Ridge	6,000	88,000	20,000	2,000	2,000	33,000	88,000
Clear Lake	131,000	1,518,000	94,000	9,000	---	136,000	412,000
Berryessa ^{2/}	30,000	774,000	50,000	12,000	2,000	36,000	2,000
Glenn Reser- voir Complex	8,000	59,000	68,000	2,000	4,000	257,000	180,000
Helena	6,000	15,000	6,000	1,000	1,000	32,000	4,000
Burnt Ranch	2,000	4,000	2,000	---	---	10,000	4,000
Eltapom	6,000	11,000	4,000	---	1,000	16,000	4,000
Enlarged Ruth	6,000	10,000	3,000	---	---	12,000	13,000
Eaton	6,000	9,000	4,000	---	---	12,000	36,000
Butler Valley	6,000	9,000	3,000	1,000	1,000	3,000	153,000
West Side							
Conveyance	6,000	44,000	22,000	1,000	3,000	159,000	2,000
Sequoia	6,000	26,000	6,000	1,000	1,000	5,000	155,000
Bell Springs	6,000	56,000	11,000	2,000	2,000	8,000	90,000
Humboldt	11,000	20,000	8,000	1,000	1,000	66,000	235,000
Knights Valley	10,000	688,000	70,000	5,000	3,000	14,000	6,000
Total	258,000	3,407,000	392,000	40,000	23,000	809,000	1,259,000
Percent in group	4.2	55.1	6.3	.6	.4	13.1	20.3
Population 1960	9,453,000	3,730,000	1,617,000	295,000	160,000	395,000	1 180,000
Per capita use	.027	.91	.24	.14	.14	2.0	7.0

^{1/} Counties in each county group listed under note 1, Chapter XVIII.

^{2/} Lake Berryessa attendance by out-of-state residents - 28,000.

TABLE 66

PLACE-OF-RESIDENCE OF RECREATION USERS
 1960 POPULATION, LEISURE TIME, DISPOSABLE INCOME,
 AND MOBILITY CONDITIONS
 (County group¹ by percent of estimated attendance)

Reservoir project	: So. : Cali- : fornia:	: San : Francisco: Bay	: San : Joaquin: Valley	: : Central: Coast	: : Mountain: Counties:	: North- east	: North Coast Counties
Spencer	7.7	46.9	13.7	1.7	1.2	5.9	23.0
Dos Rios	5.8	40.4	10.8	1.5	1.4	5.7	34.4
English Ridge	2.5	37.0	8.5	.6	.9	13.6	36.9
Clear Lake 2/ (existing)	5.7	66.0	4.1	.4	-	5.9	17.9
Berryessa 3/ (existing)	3.2	82.9	5.3	1.3	.2	3.9	.2
Glenn Reser- voir Complex	2.1	14.6	17.0	.5	1.0	64.2	.6
Helena	9.0	23.1	10.2	1.0	1.3	49.7	5.7
Burnt Ranch	8.5	18.5	9.0	.9	1.2	43.2	18.7
Eltapom	13.3	26.0	9.8	1.1	2.5	38.5	8.8
Enlarged Ruth	12.8	22.7	7.5	1.0	.9	26.2	28.9
Eaton	8.5	13.7	5.3	.7	.6	17.3	53.9
Butler Valley	3.2	5.3	2.0	.3	.3	1.7	86.7
West Side Conveyance	2.4	18.6	9.1	.4	1.3	67.3	.9
Sequoia	2.9	12.9	3.3	.5	.4	2.3	77.7
Bell Springs	3.5	32.0	6.5	.9	.8	4.5	51.4
Humboldt	3.3	5.9	2.4	.3	.3	19.1	68.7
Knights Valley	1.2	86.4	8.8	.7	.4	1.7	.8
All Projects	4.2	55.1	6.3	.6	.4	13.1	20.3

¹/ Counties in each county group listed under note 1, Chapter XVIII.

²/ Exclusive of local and out-of-state residents.

³/ Out-of-state residents totaled three percent of attendance at Berryessa.

BIBLIOGRAPHY

BIBLIOGRAPHY

- Allen, George H. and DeWitt, John W., Jr. "The Razor Clam Sport Fishery at Clam Beach, Humboldt County, California, 1955, 1958-1961." Duplicated. Humboldt State College, Arcata. About 1962.
- Alley, Bowen and Company. "History of Marin County." Alley, Bowen and Company, San Francisco. 1880.
- Blow, Ben. "California Highways." San Francisco. 1920.
- California Department of Public Works. "Report to Department of Public Works on Transbay Traffic Study for Additional San Francisco Bay Crossings." Division of San Francisco Bay Toll Crossings, Department of Public Works, State of California. 1962.
- , Division of Highways. "California Roadsides." A reprint from "California Highways and Public Works" Magazine. California State Printing Office, Sacramento. 1961.
- California Division of Recreation. "Tourist Recreation in California's Northwest Counties." Department of Parks and Recreation, Sacramento. 1961.
- California Public Outdoor Recreation Plan Committee. "California Public Outdoor Recreation Plan, Parts I and II." Sacramento. 1960.
- California State Board of Forestry. "The First Biennial Report of the State Forester of the State of California." Sacramento. 1906.
- . "California Redwood Park." Sacramento. 1912.
- . "The Sixth Biennial Report of the State Forester of the State of California." Sacramento. 1916.
- . "The Ninth Biennial Report of the State Forester of the State of California." Sacramento. 1923.
- California State Automobile Association. "Report on the California State Highway." 1921.
- Chase, Doris. "They Pushed Back the Forest." Sacramento. 1959.
- Clar, C. Raymond. "American Government and Forestry." Sacramento, Division of Forestry, Department of Natural Resources, State of California. 1959.
- Cleland, Robert Glass. "From Wilderness to Empire." Alfred A. Knopf, New York. 1949.
- Dana, Samuel Trask and Krueger, Myron. "California Lands." American Forestry Association, Washington, D. C. 1958.

- Due Pre, Edna. "The California Dons." Appleton-Century-Crofts, Inc., New York. 1962.
- Fisher, Leonard R. "Henry Cowell Redwood State Park." Duplicated Document. 1957.
- Gallup, G. "The Gallup Poll." Article in the Sacramento Union dated January 25, 1963.
- Gilliam, Harold. "San Francisco Bay." Doubleday, Garden City, New York. 1957.
- Grant, Madison. "Saving the Redwoods." Zoological Society Bulletin XXII. September 1919.
- Gregg, Professor J. W. "The Automobile Camping Ground, a New Element in Park Design." An article included in the Seventh Biennial Report of the State Forester of the State of California, Sacramento. 1919.
- Hallock, R. J., et al. "Fish, Game, and Recreation in the Klamath River Basin." Appendix A to "Klamath River Basin Investigation." California Department of Public Works, Division of Water Resources, Sacramento. 1956.
- Huth, Hans. "Nature and the American." University of California Press, Berkeley and Los Angeles. 1957.
- Kneiss, Gilbert H. "Redwood Railways, a Story of Redwoods, Picnics, and Commuters." Howell-North, Berkeley. 1956.
- Leeds, Hill, and Jewett, Inc. "Interim Report on Coastal Harbors of Refuge." California Department of Parks and Recreation. 1963.
- Leuschner, A. O. "Scenic Excursion Trips Around San Francisco." In American Association for the Advancement of Science. Nature and Science on the Pacific Coast, San Francisco. 1915.
- Little, Arthur D., Inc. "Market Demand for Boating in the San Francisco Bay Area." California Division of Small Craft Harbors, Sacramento. 1961.
- Long, Jack. "Western Sonoma County." An Article in Tenth Annual Issue of "Sonoma County Wonderland 1962-63." Hoyt Printing Company, Clearlake Park. 1962.
- Meadows, Don. "A Manual of the History and Biology of the Big Basin Redwoods State Park, California." Mimeographed Manuscript. 1950.
- Millard, Frank B. "History of the San Francisco Bay Region." The American Historical Society, Inc., San Francisco. 1924.
- Muir, John. "The American Forests." The Atlantic Monthly, Volume LXXX. August 1897.

- Osborn, Henry Fairfield. "Save the Redwoods." Natural History Volume XIX, No. 6. 1919.
- Parsons, E. T. "William Kent's Gift." Sierra Club Bulletin, Volume VI, No. 5. 1908.
- Pomeroy, Earl. "In Search of the Golden West." Alfred A. Knopf, New York. 1957.
- Reiner, George. "Shasta Valley Investigation Dwinnell Reservoir Recreational Use, 1958." California Department of Fish and Game, Sacramento. 1958.
- Santa Rosa. "Santa Rosa Annual Report, Fiscal Year July 1, 1962 to June 30, 1963." City of Santa Rosa. 1963.
- Skinner, John E. "An Historical Review of the Fish and Wildlife Resources of the San Francisco Bay Area." California Department of Fish and Game, Sacramento. 1962.
- Thornbury, Delmar L. "California's Redwood Wonderland." Sunset Press, San Francisco. 1923.
- United States Bureau of Land Management. "Preliminary Report on King Range Project." U. S. Department of the Interior, Bureau of Land Management, Ukiah, California. 1963.
- United States Department of Commerce. "1960 Census of Population." Washington, D. C. 1960.
- United States Department of the Army. "Interim Report for Flood Control and Allied Purposes, Russian River, California, Dry Creek Basin." San Francisco. 1961.
- "Public Recreation Use, Civil Works Projects, Corps of Engineers, Department of the Army." Washington, D. C. 1962.
- United States Geological Service. "Surface Water Supply of the U. S., Pacific Slope Basins in California, U.S.G.S. Water Supply Paper." Annual publication, Washington D. C. 1943-60.
- United States National Park Service. "Natural Resources of Northwestern California, Preliminary Report Appendix: Recreation Resources." U. S. Department of the Interior, Pacific Southwest Field Committee, Prepared by the National Park Service. Government Printing Office. 1958.
- "Land Use Survey Proposed Point Reyes National Seashore." U. S. Department of the Interior, National Park Service, San Francisco. 1961.
- Wilsey and Ham. "Cache Creek Basin Recreation Study." Wilsey and Ham, Millbrae, California. 1958.
- Wolfe, Linnie Marsh. "Son of the Wilderness." Alfred A. Knopf, Inc., New York. 1945.



- Osborn, Henry Fairfield. "Save the Redwoods." Natural History Volume XIX, No. 6. 1919.
- Parsons, E. T. "William Kent's Gift." Sierra Club Bulletin, Volume VI, No. 5. 1908.
- Pomeroy, Earl. "In Search of the Golden West." Alfred A. Knopf, New York. 1957.
- Reiner, George. "Shasta Valley Investigation Dwinnell Reservoir Recreational Use, 1958." California Department of Fish and Game, Sacramento. 1958.
- Santa Rosa. "Santa Rosa Annual Report, Fiscal Year July 1, 1962 to June 30, 1963." City of Santa Rosa. 1963.
- Skinner, John E. "An Historical Review of the Fish and Wildlife Resources of the San Francisco Bay Area." California Department of Fish and Game, Sacramento. 1962.
- Thornbury, Delmar L. "California's Redwood Wonderland." Sunset Press, San Francisco. 1923.
- United States Bureau of Land Management. "Preliminary Report on King Range Project." U. S. Department of the Interior, Bureau of Land Management, Ukiah, California. 1963.
- United States Department of Commerce. "1960 Census of Population." Washington, D. C. 1960.
- United States Department of the Army. "Interim Report for Flood Control and Allied Purposes, Russian River, California, Dry Creek Basin." San Francisco. 1961.
- . "Public Recreation Use, Civil Works Projects, Corps of Engineers, Department of the Army." Washington, D. C. 1962.
- United States Geological Service. "Surface Water Supply of the U. S., Pacific Slope Basins in California, U.S.G.S. Water Supply Paper." Annual publication, Washington D. C. 1943-60.
- United States National Park Service. "Natural Resources of Northwestern California, Preliminary Report Appendix: Recreation Resources." U. S. Department of the Interior, Pacific Southwest Field Committee, Prepared by the National Park Service. Government Printing Office. 1958.
- . "Land Use Survey Proposed Point Reyes National Seashore." U. S. Department of the Interior, National Park Service, San Francisco. 1961.
- Wilsey and Ham. "Cache Creek Basin Recreation Study." Wilsey and Ham, Millbrae, California. 1958.
- Wolfe, Linnie Marsh. "Son of the Wilderness." Alfred A. Knopf, Inc., New York. 1945.



- LEGEND
- STATE PARK
 - POINT OF INTEREST
 - MAJOR RECREATION AREA
 - POTENTIAL RECREATION AREA
 - HYDROGRAPHIC UNIT BOUNDARY

STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES
NORTHERN BRANCH
NORTH COASTAL AREA INVESTIGATION

LOCATION MAP
FOR THE
RECREATION RECONNAISSANCE
IN THE
NORTH COASTAL AREA
AND
WEST SIDE SACRAMENTO VALLEY
1964

215 MILES



THIS BOOK IS DUE ON THE LAST DATE
STAMPED BELOW

RENEWED BOOKS ARE SUBJECT TO IMMEDIATE
RECALL

1 JUN '67

~~JUN 14 1971~~
~~SEP 29 1971~~
UCD LIBRARY

DUE JAN 5 1972

UCD LIBRARY

MAY 6 1969 DUE JUN 5 1973
JUN 5 REC'D

UCD LIBRARY

DUE JUN 6 1970

JUN 30 REC'D

JUN 11 REC'D

UCD LIBRARY

DUE ~~JUN 12 1970~~

~~JUN 12 1970~~

JAN 25 REC'D

DUE JAN 6 1971 RECEIVED
JUN 10 1980

~~JUN 31 1971~~
LIBRARY, UNIVERSITY OF CALIFORNIA, DAVIS

Book 50-50-1, 64 (772s4) 458

399690



California. Dept.
of Water Resources.
Bulletin.

no. 136
Aug. 1965

PHYSICAL
SCIENCES
LIBRARY

March 1965

LIBRARY
UNIVERSITY OF CALIFORNIA
DAVIS

